

PRAGMATIC PHILOSOPHY



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INTRODUCTION

Free Will is a myth. Our *personality* is conditioned by heredity, endocrine glandular functioning, nutrition, assimilation and environmental influences. Insufficiency of thyroid makes one physically and mentally sluggish, dull and clumsy, suffering from constipation, adiposis, sleepiness, autointoxication with dull lustreless eyes and coarse falling hair. Hypersecretion of thyroxin imparts vivacity and restless energy, makes the eyes open and bright, enhances metabolism and consequently keeps one lean. Hypersecretion of the pituitary during the growing period creates long lean type—gigantism—and acromegaly after the closure of epiphyses. In pituitary deficiency, the people are undersized, fatty, lethargic, usually associated with sexual apathy. Ovarian hypersecretion creates in females the feminine charms and attractions, makes her slim, ardent, warm-hearted and impulsive. Ovarian hypo-secretion makes her ego-centric, cold, calculating, selfish. Hypersecretion of interstitial cells makes the man virile and active, sociable and adventurous. Hypo-secretion of the interstitial cells makes the man womanly, imaginative, secretive, selfish, and suspicious. Hypersecretion of adrenals raises the blood pressure, and imparts physical and mental energy and combative spirit. He is bold and daring. His steam of life is overheated. Hyposecretion of adrenals makes one timid, cowardly, and develops in him physical apathy, worry, and fear complex. He lacks the driving force, the idealism in life. He easily succumbs to the herd-instinct.

Happiness is the biotic urge—*libido*—of every organic existence. In the normal exercise of every healthy organ, there is an exhilarating stimulation and pleasurable sensation. Their summation is happiness. The joy of living therefore depends on the co-ordinating healthy functioning of all the organs, their mutual adjustments, the harmony between the conscious or subconscious physical impulses and psychic urges, and their adjustments to environment. No doubt one should strive his or her best to alter the circumstances—the environmental influences—to fit to his or her physical and psychic *libido*. But when one cannot do so, practical philosophy of life demands that we should gradually adapt and adjust ourselves to reality, instead of accentuating physical and mental disharmonies, worry and fatigue through endo-psychic conflict—in the vain struggle of physical impulses against conscious or subconscious mind. **Pragmatic Philosophy** deals in general outline, therefore, with the physical impulses and problems, and how far their adjustments are possible with our conscious or sub-conscious mind and ideals of life.

PRAGMATIC PHILOSOPHY

1—INFANCY

A babe is the fulfillment, culmination and embodiment of love. Mother, father and child form the sacred trinity—an immortal imperishable link that may be continued *ad infinitum*—in ever-reaching inheritance to be transmitted from generations to generations. A child is therefore entitled to be born only in the full and luxuriant exuberance of the parental love which imparts to it vitality and energy, and grow in the midst of their radiating happiness which constitutes its chief spiritual nourishment. For the child to have a sound constitution and alert mind, it is essential that not only it should have received life from the fullness of its parental happiness—not from a mischance—but its parents have also had attained their physical and mental maturity. A man does not attain his physical maturity before 25, and a woman before 22 a few years after her puberty. Mental maturity is dependent on environmental influences. Majority of men are not mentally mature before they are thirty, and some women never.

The first act of the new-born is to inspire. With the separation of the placenta from the maternal connection and the tying of the cord, the whole circulation of the infant is profoundly altered. For the first time a full current of blood distends the pulmonary arteries to meet air in the newly opened vesicles of the expanding lungs. The throat is enlarged and the diaphragm and abdominal viscera are depressed. With the establishment of respiration lividity of the skin, due to the interference by putrefaction with the fetal circulation is rapidly exchanged for the deep-red of the new born infant. This hue fades in a few days, and the skin not infrequently assumes more or less yellow tinge (*icterus neonatorum*) unaccompanied however by any symptoms of systematic disorder. It may be associated with the disturbance of hepatic circulation due to the alteration of its supply. This yellow tinge gradually disappears of itself and by the third week of life the skin assumes the rosy tint of healthy infancy. The fine soft hairs which at birth frequently cover almost the whole body generally fall out by time and are not renewed though some infants may retain them for a while longer. The long strong hairs on the scalp with which many infants are born fall out at a later period and are replaced by a finer and lighter colored hair. At birth the eyebrows and side locks

glands are inactive And the activity of the sweat glands does not commence before the third month Sebaceous glands, on the other hand, are very active from birth In the third month the secretion of those in the scalp gives the vertex the appearance of having been smeared with wax, and later on forms a distinct crust of a yellowish brown color (*seborrhœa capillitii*), portions of which can be easily removed by the finger nail, while that of adjacent skin may be found in normal state Sebaceous secretion however ceases spontaneously about the end of the first year, when the scales, if still remaining, dry and crumble away Fat is abundant in the subcutaneous tissues of a healthy infant, but is generally absent from the interior of the body The muscles in the first few months are small and soft, and not till after sixth month can they be felt firm and resisting The bones are still in great part cartilaginous, and possess therefore great flexibility With the introduction of air the compact tissue of the foetal lung is covered with a spongy alveolar structure and expand The thymus gland, situated in the thorax and partly in the lower region of the neck, is of large size and increases till about the close of the second year when it ceases to develop, and after the eighth it rapidly decreases in size The thyroid gland of an infant is also relatively larger than in adult The liver is also larger The kidneys are also of comparatively large size At birth urine is normally present in the bladder and should be voided during the first twelve hours The suprarenals at birth are as large as in adult The urethra and vagina are distensible The mammary glands are well-developed, possessing secreting structure in both sexes The pulse rate during infancy is much more rapid than during childhood or in adult age and is easily disturbed by slight causes A girl's pulse is a few beats more rapid than that of a boy At birth the pulse rate is 120-140, at six months 110-120, at twelve months 105-115, at five years 80-90 The feces of an infant after the first few days should be of an orange-yellow color of soft homogeneous consistence, acid in reaction, and not offensive in odor At birth the circumference of the head much exceeds the circumference of the thorax But with the rapid development of the lungs, though the head grows, at the end of the first year, thorax exceeds the head Between the sixth and eighth month dentition generally commences with the eruption of two central lower incisors, four upper incisors 8th to 10th months, two lateral lower incisors as four first molars between 12th to 14th months, four canines between 18th to 20th months, four second molars between 28th to 32th months Growth does not always take place uniformly The head often increases in size, sometimes the extremities Infancy is included in the period between the birth and the first dentition

It is desirable that mother should feed her own baby from her breast wherever possible It is advantageous to both mother and the child The babe enjoys suckling milk from the mother's breasts Mother receives delightful

gentle voluptuous sensation through the baby's internal and external pressure on its mother's breasts through suckling, as a female breast is a strong erotogenic centre, and it is intimately connected with the uterus. It has been found that definite contraction of the uterus takes place during the baby's suckling, particularly for the first eight days after its birth, thus quickening the involution of the womb. Thus through mutual dependence for pleasurable sensations, intimate psychic relationship and sentiments are developed between the mother and the child.

An infant should be applied to the breast the first day to induce the flow of milk and should be fed every two hours during the first two months, except at night when the intervals may be three hours. During the next month it should be fed every two and a half hours by day and and three hours by night. And from the end of the third month onwards it should be fed every three hours by day and may miss one feed at night. When the mother's milk is very profuse, the infant gulping it down in haste may suffer from flatulence and colic. In that case mother should regulate the flow by compressing the nipple between her fingers, or the baby is taken from the breast at short intervals during the feed. A nipple-shield with a teat which will not allow too easy a flow may be also used with advantage. As proteid is increased by shortening the intervals between feeding, so excessive proteid the cause of baby's colic, may be reduced by lengthening the intervals between feeds. The infant may also be induced to suck for 4-5 minutes at both breasts so that it gets only the weaker fore milk, instead of taking the whole contents of one breast at each feed. Another method is to give $\frac{1}{2}$ -1 ounce of plain boiled water to which a quarter of a teaspoonful of milk-sugar is added, immediately before breast feed so that the breast milk may be diluted in the infant's stomach. If mother's milk is deficient or scanty, complete rest, malted milk or Lactogen (cotton seed extract) is likely to promote the flow of milk. If not the simplest artificial food is cow's milk diluted with two parts of boiled water and with the addition of 1 teaspoonful of cream and a quarter of a teaspoonful milk sugar at each feed. In human milk nearly all the phosphorus is in organic combination, while in cow's milk not more than half is. Cow's milk is much richer in calcium and protein contents which provoke protein indigestion. All infants artificially fed should be given fresh orange juice daily beginning with a few drops at the end of the first week, then gradually increasing the quantity of 1 teaspoonful at the end of the first month to two spoonfuls at the end of the fourth month and thereafter. Twice the amount of fresh tomato juice diluted with an equal amount of water may be used in place of orange juice to supply the body with vitamins which are destroyed in milk when boiled and unboiled or unsterilized milk is too dangerous to be given to any body as it may harbour many pathogenic germs for which it is an excellent culture medium. At three

months equal parts of milk and water, and at six months three times as much milk as water may be given to the baby. At four months two table spoonfuls of strained vegetable soup may be added with advantage, at five months, three table spoonfuls of the vegetable soup, at six months, one table spoonful of strained cereal gruel, two ounces of vegetable soup, and one teaspoonful of vegetable pulp at eighth month, the double amount of the seventh month may be given. Strong decoctions of barley, though it is the best cereal for infant, as it is bland and non-irritant, is not recommended until the age of nine months, as it may cause intestinal disturbance, as the digestive apparatus for starch is not sufficiently developed. A normal infant after its birth cries lustily to draw air into its lungs. As soon as the umbilical cord which unites the body to its mother has ceased to beat, it is tied about 2 inches from its navel and is divided above the ligature. The cord is to be wrapped in a sterilized gauze pad and the dressing is not to be removed until the seventh to the tenth day when the umbilicus is healed. The baby then lies to be bathed, well-supported in the left hand of the nurse, in warm water of 105° F, care being taken to avoid wetting the gauze pad covering the cord. If its body is covered with a *gelatinous* sebaceous matter—*Unguis Casosa*—it should be carefully removed by absorbent cotton, wetted with a sweet oil. When its body has been dried, it should be dusted with benedict starch and then dressed in loose, soft and warm clothing. One drop of 2 p c solution of protargol should be dropped within each eye of the baby as a necessary preventive measure against *ophthalmia neonatorum*. Diapers should be made of soft absorbent material about 2 feet square. And the infant should be laid in a cot by itself as more than half the deaths from violence of infants under one month are due to suffocation in bed with adults. A healthy infant should spend most of its time in sleep, and should be laid into its cot immediately after feeding. Night and morning the mouth and nostrils should be cleansed with wet pledgets of cotton wool.

Habit Formations should be developed. The growth of the mind begins with the growth of individual behaviour. The whole life is a continuum of mental growth. Within two months after conception spinal reflexes are observed in the foetus. In the third month movement may be observed. In the fourth, fifth and sixth months, cervical and labyrinth reflexes, involving head, arms and legs, are evident. By the seventh month most of the vital reflexes necessary for extra-uterine existence are well advanced so that prematurely born infant gets a chance of survival. An infant of six to nine months, whether within or without the womb, is already a habit-forming creature. It is sensitive to light, sound, pressure, temperature and change of position to some degree even before its birth. Though the new-born infant seems to be incoherent and vegetative, yet with

adaptability to the new environment and habit formations its personality is integrated. Reactions to the organic cravings of hunger, thirst, sensitivity to light, pressure, sound and temperature, seeking and avoiding responses—organize the instinctive impulses and intensify individuality. Sensory-motor responses are developed. An infant can close in with two hands upon a dangling object in 18 weeks, pick up an object on contact in 20 weeks, sit alone in 9 months, walk alone in 15 months, run in 2 years. His habit formations and learning to adapt himself to surroundings constitutes his intelligence. Habits of regularity in feeding, sleeping, bowel movements, bathing should be developed from the beginning as they will not only improve its health, but will also develop strong personality. If a baby is taken up when it cries, it learns to cry to attract the attention to fulfill its desired object. But if it finds that its crying does not accomplish its objective, it learns that it is useless to cry for that purpose, and thus this type of crying habit is prevented.

To develop good and useful habits and to inhibit bad ones trained parenthood is necessary. Most of the mothers, ignorant of child psychology, are unfit to discharge efficiently that responsibility. Is it necessary then to bring up children in well-equipped **state-nurseries** as it was done in Dorin Spuria by trained nurses, or not to grant marriage licences before the parents prove their fitness by appropriate theoretical and practical examinations on the subject of parenthood? A child is no more individual concern of its parents. It is a social and state unit, value and an asset. To enhance its value the modern state is taking increasing interests for its upbringing, education and utilization of its service. Though state nurseries may be well fitted to develop the health, intellect and the co-operative social instincts of its inmates, yet it cannot ignore or equalize their hereditary differences. And will it advance social progress and modern civilization if parental responsibility is replaced by state management? Mutual love and attachment between parents and their children develop spontaneous bonds of social service. In state nurseries health may be better promoted through proper and regulated nutrition and plays, intellect may be developed by imitation and competition through standardized competent teachings. Social sense of duty may be developed through herd instinct. But though average home lacks the competence, equipment and regulated systematic able management of an up-to-date nursery, yet the home life is charged with the subtle psychological factor—mutual dependence for pleasure and comforts—and inspiring love and affection, a stronger bond than a mere sense of duty. The ecstasy of pleasure is a dynamic factor. Its benitude has been glorified as divine. Its inspiring impulses have led to great achievements and accomplishments in human progress. Whether its re-orientation will lead to greater success is still in experimental stage. Individualism is not opposed to socialization. Both these sentiments can

eight times as much as organic mineral salts. Consequently childhood is subject to digestive disturbance. Therefore its dietetic regulations should only be relaxed gradually. The quantity of food must be increased with the child's age and growth. A healthy child should weigh at birth 6-8 pounds at one month 7 1/4, at two months 8 1/4, at three months 9 1/2, at six months 12 1/4, at nine months 15 1/8, at twelve months 18 1/8 pounds. In the fifth and the sixth month a child requires about 2 pints of milk to be duly given every 2 1/2 hours, in the seventh and eighth month it requires about 2-2 1/2 pints of milk a day to be given every three hours, in the ninth and tenth month it requires 2 1/2-2 3/4 pints daily to be given every four hours. At the eruption of the first tooth which takes place at this time, the child may be weaned from mother's breast, unless she has plenty of milk in which case weaning may be postponed a couple of months longer. The proteid of cow's milk is mainly *Casein*, that of woman is largely *lactalbumin*. Though this difference may slightly interfere with digestion still the child can be accustomed gradually to the cows' milk. Only a little additional cream and sugar of milk should be added. Sugar of milk, though not so sweet like cane sugar, does not ferment and consequently give rise to acidity and catarrh like the later. Any starchy food should not be added to the milk of the child before it has got several teeth when salivary and pancreatic secretions become active. Though the inclusion of cereals appears to be apparently beneficial as indicated by the increase in weight, the cereals being poor in vitamins and available minerals, the rapidly growing child suffers from defects of calcification of bones and teeth, and diminishes its resistance to broncho pneumonia, intestinal and other infections. However malted foods may be added as malt contains an enzyme (*diastase*) by which it can convert its own weight of starch. 18 months old child requires about three pints of milk a day, consisting of 1 part of proteid, 1 5 parts of fat, 8 5 parts of carbohydrates, nearly 0 3 food of a man doing ordinary work. At this time a fruit should be given every day, an orange, an apple, a pomegranate, a pear or grapes. Occasionally chicken broth (a table spoonful) may be given with advantage. A child of 2 years requires 0 3, of 3-5 years 0 4, 6-9 years 0 5, 10-15 years 0 6. 14 years 0 8 of the food of an adult man doing ordinary work. Children digest quickly. Their metabolism is active. They have powerful digestive ferments. The elements of food are assimilated and converted into blood, flesh, nerves and bones. Therefore they should be allowed as much carbohydrates for muscular development as an adult, vegetables of similar amount for alkalizing mineral salts, fruits for vitamins and alkaline salts, proteids about 3/4 amount chiefly from milk and milk products to be supplemented by meats of fish, fowls and animals, rich in iron. As thyroid glands and the hepatic secretions of children are very active they should not be therefore excessively stuffed with meat, whose

his association with others. Child's brain up to the age of seven is plastic and is in formative period. It should not therefore be subject to excessive fatigue through over-exercise. No doubt he should be taught to observe and think. But the present system of cramming and examinations are not only unsuitable to his temperament, but even opposed to right education. It is just like feeding a child with undigestibles and then using an emetic for vomiting them on examination papers. As in the physical line such a continued process would upset digestion and nutrition, so educationally it will provoke mental dyspepsia and disturb independent thinking. Childhood must be passed in radiant health, optimistic outlook of life, keen observation and their appreciative receptions, and not to be depressed by the phobias of written examinations, success in which is no criterion of real intelligence. Childhood is like a bud of a flower. Instead of forcibly opening its petals which emit but a bad odor, it should be allowed to gradually expand in sunshine into a full-bloomed flower, radiating joy, beauty and fragrance all around.

III—PUBERTY

Every individual repeats the phylogeny during the course of his development and growth. A human body in its fetal growth has traversed through ameboid, helminthoid, piscian, amphibian, anthropoid, ethmoid and many intercalary stages of ascent. Consequently its rate of growth is not uniform, nor all the organs grow proportionately. The human ovum, when ripe for impregnation, measures about 0.2 mm in diameter and weighs 0.003 milligram. At the end of the first month of the embryonic growth of the fertilized human ovum the fetus measures 7.5 mm, which means 3650 p.c. growth. Second month 14.4 mm (92 p.c.). Third month 77 mm (434 p.c.). Fifth month 230 mm (70 p.c.). Sixth month 315 mm (27 p.c.). Seventh month 362 mm (15 p.c.). Eighth month 415 mm (14 p.c.). Ninth month 452 mm (9 p.c.). Tenth month 490 mm (8 p.c.). Human embryo at the end of the third month weighs about 12 grams which indicates a growth of 400,000,000 p.c. At the end of fourth month it weighs 85 gr (633 p.c.). Fifth month 254 gr (223 p.c.). Sixth month 634 gr (123 p.c.). Seventh month 1215 gr (92 p.c.). Eighth month 1834 gr (51 p.c.). Ninth month 2235 gr (22 p.c.). Tenth month 2717 gr (21 p.c.). Weight accordingly increases from impregnation to birth 905,600,000 fold. Though the newborn human baby is millions of times heavier than the impregnated ovum, when its momentum of growth became accelerated in the next five years the adult will become only 25 times heavier than at birth.

primitive history of man. In the savage stage premature girls were forced to sexual unions, and those girls that were strong enough to escape the male aggressions contributed to individual growth which would have otherwise spent in genesis and these strong girls who were impregnated transmitted their rapid growing quality to future generations. The greatest growth in girls generally precedes their puberty by a year, and puberty occurs in the female about two years earlier than in the male.

Sex organs have differentiated and developed to make procreation less wasteful, fewer and surer, more nervous and delightful as we ascend phylogenically in the scale of evolution. During human embryonic growth male and female sex organs have seven parts in common while there are thirteen homologies which are slowly differentiated as the embryo becomes fully sexed. Up to ten or twelve years of age the internal structure and the outer form of the breasts is nearly the same for boys and for girls. But at puberty the galactophores (mammary glands) and the supportive areolar tissues develop rapidly in girls. Fat develops and the alveoli enlarge and new ones are formed. Full development of the breast occurs during pregnancy. But the ivory-white chalice from which men quaff love and infants life, have different shapes according to race. The breasts of Austrians are pyriform of Negroes, high conical, of Mongoloids shell (disc) shaped of Mediterraneans oval of Alpines hemispherical.

Puberty philologically means becoming hairy. The soft hair called vulva of the girl becomes enlarged at the time of menarche by the deposit of fat, and its substance becomes tough and elastic. Generally before menstruation fine pale hairs make their appearance here and there, but not until puberty (about 13 in girls) does the hair covering of the pubic region become more or less thick. With the rapid development of the breasts fat appears under the armpits. In boys puberty appears about a year later than in the girls (about 14) when the hair begins to grow in the pubic region. It is under the armpits and between 17-18 comes in the axils. The growth of the denser pubic hair begins with the appearance of hairs along the middle of Mons Veneris and at the margins of labia majora. Early sexual development is indicated by an early and thick growth of the pubic hair. In the virgin the pubic hair is smoother and less curly than in the later course of the sexual life. Adipose tissue is developed and the integument thickens. Fattened labia majora completely covers the labia minora (nymphs) of infant in texture, lotus red in color and hairless. The clitoris enlarged is concealed. The vulval cleft (rima urogenitalis) is entirely closed and more partially hidden by the enlarged close approximation of labia majora, which is also added by the rapid growth of the hip and the thighs. The sebaceous glands of the labia minora secrete a sanguis which collects round the glands clitoridis and undergoing decomposition it diffuses an agreeable aromatic odor. Ovaries from early girlhood grow in each of their three

dimensions. But at the dawn of puberty there is an accelerated growth. Up to ten the ovaries are at the level of the iliac fossæ, but now they become intrapelvic and more or less mobile, owing to their erectile function and traction of the uterus and Fallopian muscles. A slight projection at the single point marks the ripening of the first Graafian follicle, the four-weekly rupture of which is later to scarify the previously smooth ovarian surfaces. The parenchyma of the ovaries from which the ova germinate becomes swollen and on its endocrine secretions feminine characteristics as the enlargements of the uterus and breasts, are developed. At the commencement of the puberty there are in each ovary about 36,000 ova, giving a total for the two of 72,000. But the ovarian growth continues for some years after puberty before they attain their adult dimensions, the right always slightly leading the left. The infantile uterus is greatly enlarged and changes from a cylindrical to its characteristic pyriform shape. As the pelvic cavity enlarges it tips forward, and its anteversion is slightly diminished, its neck becomes relatively shorter, and the orifices toward the tubes become longer and more opened as the cavity grows larger. The vagina is enlarged in both length and breadth. The rudimentary clitoris, corresponding to the male penis, becomes enlarged and acquires erectibility. The hymen grows in both thickness and tenacity.

In the male sexual glands and organs, changes are no less marked. Scrotum expands, spermatic cord lengthens, the testes descend further and become enlarged. Corpora spongiosa and corpora cavernosa increase in size and volume thus fortifying vas ularity and crithism. The seminiferous canals, hitherto round and smooth, become turgid by the development of large spermatophore cells which produce clusters of spermatozoa. Spermatozoon is about $\frac{1}{450}$ of an inch in diameter, and about 226,257,000 spermatozoa are produced in both testicles per week. In the beginning of puberty this testicular secretion is not ejaculated, but is resorbed (*in situ*), partly at least by the rich plexi of lymphatics which surround the canals, thus utilizing this valuable material for strengthening the body and the nerves. But the continued accumulation of the spermatic secretion exerts pressure on the walls of the vesicles which causes ejaculation by reflex action. This is often associated with voluptuous dreams. Pubescent, ignorant of physiology, and usually uninformed and uninstructed of this quite natural process, regard the nocturnal ejaculations with great dread, and regard it as a foreboding of a serious nervous sickness and exhaustion. Yet a little instruction by health teacher or parents may relieve the pubescent of their unnecessary nervous tension and prepare them to welcome puberty, instead of dreadful anxiety, with pleasure, when new senses are awakened, like a budding flower before the sun.

To an uninstructed girl the appearance of first menstrual bloody discharge is no less a dreadful event. The dawn of glorious womanhood becomes to her an object of mental gloom and dejection, fear and shame. During the first menstruation girls commonly appear pale, anxious and nervous. They have blue rings beneath the eyes. There is a dragging sensation in the loins, an indefinite feeling of pressure in the lower part of the belly, especially in the region of the ovaries and uterus. The face has a tired aspect. There is a general want of tone, combined with abnormal irritability. There is a repugnance of sustained physical or mental activity. Movements lack energy. Somedays before the first onset, the vulva, labia majora and minora, and the vaginal mucous membrane become swollen. The clitoris becomes conspicuous due to erectile processes. The breasts become sensitive and slightly turgid. There is digestive disturbance with loss of appetite. A slight secretion appears in the vagina, followed by a blood-stained mucous discharge, thereafter becoming sanguinous, lasting usually for four or five days. After the first menstruation not always subsequent discharges follow at regular intervals of four weeks. In weak and anemic girls the second menstruation may not occur till several months have elapsed after the first.

Menstruation among the Austriacs commonly begins as early as 8 years, and at the very latest at the age of 12. Among the Amerinds of tropical America it varies from 9 to 12, among the Amerinds of temperate America between 12-14. In India, Ceylon and Siam menstruation begins between 12 to 13. In Southern Persia at the age of 12 and Northern Persia at the age of 14. In Syria, Turkey and Algeria at the age of 12. In Japan between 13 to 14. Spanish girls menstruate at the age of 12, Southern Italians at 13, Northern Italians at 14. Southern French at the age of 14, and Northern French at the age 15. English and American girls at the age 15½, Germans at 16. Hungarians, Poles, Russians and Finns at 15½. Danes and Swedes at 16½. Does the **animal rut** correspond to *human menstruation*? In cows it occurs every three weeks, in the hippopotamus, guenon and many apes, it is monthly, in the chimpanzee 24 days. A baboon averages six weeks, but the intervals are more frequent in late autumn and winter than in summer. The animals have definite breeding seasons in different parts of the world. In the non-breeding season ovulation does not occur with menstruation, and is suspended. Among the Eskimos during the winter there is no menstruation. Human beings like lower animals had also breeding seasons, possibly spring and autumn when the food supply is ample, and the females are susceptible to conception. But human beings with better supply of nutrition and preservation of warmth of the body through clothing have overcome the animal breeding seasons. They can enjoy sexual congress throughout the whole year at their free will.

Among the monkeys (*Macacus rhesus*, *Semopithecus entellus*), their periods are marked by congestion of the skin of abdomen, legs and tail, nipples, face, vulva together with the regular flow of blood and detritus

Animal	Age of puberty	Length of life	Animal	Age of puberty	Length of life
Guinea-pig	$\frac{2}{3}$ years	6-7 years	Horse	$4\frac{1}{2}$ years	30 years
Rabbit	$\frac{2}{3}$	8	Hog	5	30
Cat	1	12	Hippopotamus	5	30
Goat	$1\frac{1}{4}$	12	Lion	6	30-40
Fox	$1\frac{1}{2}$	13	Arab Horse	8	40
Cattle	2	18	Camel	8	40
Dog	2	15-20	Elephant	30	100

Menstruation is the cyclic and periodic repetition of various physiological functions. Puberty is hastened by race, climate, heredity, nutrition and environmental stimuli. But it is co-related with glandular secretions and their syncretism.

In the **male** the endocrine part of the testicle consists of the so called *interstitial cells* of Leydig. These are aggregations of epitheloid cells containing both acidophile and basophile granules, the cells resembling somewhat the anterior lobe of the pituitary and the suprarenal cortex, and like the latter, mesoblastic in origin. In the **female** it is the interstitial cells of the ovary, and perhaps the cells of the corpora lutea that are responsible for the endocrine function. The endocrine secretion from these interstitial cells of the gonads is essential for the developments of **secondary sexual characters** in both the male and the female, at puberty. They are hypertrophied at puberty with the atrophy of the *Thymus*. Before puberty the bodies of boys and girls resemble one another closely. But with the hypertrophy of the gonads at puberty, there is not only hyperplasia of the sexual and generative organs, distinct changes take place, characterizing masculine and feminine types. In the *boy* the larynx enlarges, voice changes, the beard and moustache begin to grow. In girls, the breasts enlarge, the pelvis expand, and fat is deposited about the hips. In both sexes, hairs appear in the axillæ (*hairs*) and above the symphysis pubis (*crines pubis*). The pubic hair in the male assumes a triangular disposition, the apex of the triangle extending towards the umbilicus. In the female the pubic hair on the mons veneris is limited above by a horizontal line, the apex of the triangle being downwards, the base upwards, quite opposite to that of the male. During pregnancy, the proliferation of the interstitial cells of the ovary is rather enhanced than reduced. Only the activity of the follicular apparatus of the ovary stops during pregnancy. Gonad have sympathetic relation with thyroid, anterior lobe of the pituitary and the chromaffin system. During pregnancy, thyroid is enlarged, suprarenal cortex is hypertrophied whose increased activity is reflected in adrenal

hypertension, elevation of body temperature, epinephrin-glycosuria, hypertrophy of the nasal conchae, enlargement of the breasts. In the overfunction of the gonads (Hypergonadism) there is premature and excessive development of the external genitals and secondary sexual characters, excessive development of the body as a whole, and premature change of voice. In male children who manifest such **pubertas precox** the sexual impulse may develop in early childhood with erections and ejaculations. The rate of bodily growth is abnormal. But as sexual development brings about early epiphyseal closure, stature growth is interfered, and they remain short and stocky, but strong. Mentally they may remain infantile, though it is modified by premature sexual eretism. There is a recorded case of a boy in whom hypergonadism began at the fifth year of life with a tumor of the left testicle. The tumor was removed in the ninth year of the boy by an operation. A month later the hairs of the beard and the axillae which had developed prematurely fell out though the pubic hair persisted, the external genitalia grew smaller, erections and pollutions ceased, and the voice which had changed again became infantile. There are many cases of **menstruatio precox**. The external genitals begin to enlarge and grow faster than normal, genitals, the breasts develop, the hairs appear in the axillae and pubes abnormally early. Both sets of teeth come prematurely. The ossification centres appear more early than normal and the epiphyseal lines are closed at an early date. Medical literature contains many accounts of menstruation occurring before the first birthday and regular periods being established between the ages of five and ten. That such cases represent true functioning maturation of ovaries is shown by several accounts of pregnancies before ten years of age. An extreme example of this unusual occurrence was the recent case of a completed pregnancy in a five years old girl. In one case menstruation appeared at two years. She became pregnant at eight and shortly after excessive growth of skeleton growth ceased. She grew to be a woman and lived to be 75 years old. In another case menstruation appeared in the sixth year when the uterus was as large as that of a seventeen-year-old girl. After removal of a sarcoma of the ovary menstruation ceased.

In **Eunuchoid Hypogonadism** there is marked statural overgrowth with characteristic delay of sexual maturation. Marked slimness is the rule, and the extremities are disproportionately long compared with the trunk. The face is round, the lips and cheek thick, thyroid small, genitals infantile, the ossification delayed, second dentition delayed. There is a delay in the appearance of the ossification centres and delayed epiphyseal closure, but retention of the infantile appearance and dimensions of the body. There is not only retarded growth of genitals but retarded and deficient development of secondary sexual characters and vita sexualis.

Pituitary Gland (Hypophysis Cerebri) has two lobes—posterior and anterior. Posterior lobe regulates structural growth and accelerates metabolism, particularly of calcium. Hyperfunction of the posterior lobe of the Pituitary leads to gigantism. But if hyperfunctioning continues after epiphyseal closure due to the atrophy of the thymus there is distorted hypertrophic changes in the bones, known as *Acromegaly*. Hyperplastic changes in the osseous system involve more the facial skull than the cranial skull. The face becomes elongated all the bones becoming prominent. It is widened somewhat in the transverse direction. The bones, cartilages and soft parts of the nose are enlarged. Nearly half the giants become acromegalic in later life. The anterior lobe of the Pituitary contains acidophile and basophilic cells the latter is the site where the pituitary sex hormones are elaborated. The Pituitary sex hormones are two in number—A and B *prolactin*. Prolactin A stimulates in males the activity of germinal epithelium, while B prolactin stimulates interstitial cells to activity. The germinal epithelium (of seminiferous tubules) produces spermatozoa while interstitial cells secrete sex hormones, the basis of secondary sex characters. In females A *prolactin* stimulates follicle development of the ovary whereas B *prolactin* activates cells of corpora lutea. In the normal hyperfunctioning of both the lobes, there is a great growth of stature with hyperplasia of the genitals. In the hyperfunction of both the lobes (Frohlich's syndrome), there is undergrowth, hypoplasia of the genitals, obesity and fat pads accumulate about the abdomen, hips, buttock, breasts and shoulders. But the obesity is characteristically confined in the trunk and does not extend to the extremities, particularly the forearms, legs and hands. There is an increased carbohydrate tolerance (*hypophyseal dystrophia adiposogenitalis*).

The Chromaffin System including the medulla of the suprarenal glands and paraganglia produces epinephrin (adrenalin), and continuous supply of this substance to the blood, through which it acts upon the sympathetic nervous system, maintains blood-pressure and sympathicotonus in general and hairy growth. The hyperfunctioning of the adrenals in early age hastens *pubertas precox*. There is an abnormally rapid growth, excessive liveliness and unusual strength (Herculean Infants). Fat accumulates in hips, buttocks, abdomen and mons veneris. There is premature excessive development of hair in pubes, axillae, and in the male on the face. The external genitals undergo the changes that correspond to that of puberty (enlargement of the penis or clitoris, increase in the size of the labia, closure of the vulva, turgescence, mammary gland development, menstruation, in boys change of voice with erections and pollutions). These appearances may come as early as the fifth or sixth year of life, or even earlier. Generally it is due to a tumor in the cortex of suprarenals which abnormally increases its secretion. If there is hypersecretion after

the age of puberty, virilism or hirsutism is developed. Muscular power is excessively developed with an abnormally strong sexual excitability. Women perform extraordinary physical feats. They grow moustaches or beards. Instead of the upper transverse limitation of the crines pubis, characteristic of woman, triangular form of crines characteristic of the male appears. Long hairs may grow on the abdomen, chest, extremities and shoulders. There is hypertrophy of the clitoris, though the external genitalia otherwise remain normal. But there may be disturbances of menstruation. Nausea prevails. There is unusual strength and hypersthenia, associated with obesity. Congenital hypersecretion provokes **Pseudohermaphroditism**. Some of these hermaphrodites have internal sexual organs like those of normal females, but their external genitals resemble the male type (enlarged clitoris, urethra of male type, prostate, slitlike vulva more or less closed so as to resemble a scrotum). The opposite type has the external appearance of the body, and whose external genitalia resemble those of a female, but whose internal sexual organs are that of a male. Hypofunction of the adrenals is associated with hypoplasia of the vascular system and genitalia, persistent thymus, large tonsils, low blood-pressure and asthenia.

The Thyroid Gland is the central organ for iodine, phosphorus and calcium metabolism. It elaborates *iodothyron*. Iodothyron in the blood activates (1) neurons of the vegetative nervous system and (2) cells concerned in combustion process (oxidations). In addition it seems to influence profoundly either directly or indirectly the *cerebrum* (psychic processes), the muscles (voluntary, cardiac), lymphocytogenous organs (thymus, lymphatic glands), gonads and cromaffin system. In hyperfunction of the thyroid, the combustion process of the body is fanned into an intense flame. Protein metabolism is distinctly accelerated. While carbohydrate metabolism is slowed due to its inhibitory action on pancreas. The body is lean. The body temperature is high. Pulse is rapid. Skin is thin and transparent. Hair is glossy. Eyes are bright and open. There is extraordinary nervous energy. Sexual excitement is high. Mind is active. Disposition is optimistic. Appearance is youthful, beaming with life and energy.

In hypofunction of the thyroid, the temperature is sub-normal. The blood-pressure is usually low. Vasomotor reactions are sluggish. Protein metabolism is slowed. Carbohydrate metabolism is heightened. There is obesity. The skin is thickened, dry and rough. Double chin, pads of fat above clavicles and thick folds on the abdominal wall appear. The hair is thin and lacks lustre. It becomes dry and tends to fall out. Nails break easily and show longitudinal grooves. There is a feeling of cold even in warm weather, and of weight in the limbs. Memory is feeble with slowness of thought. Lack of energy and initiative is marked.

Vita sexualis is reduced. In congenital myxedema, as the child grows older the head may increase in size, but the rest of the body skeleton remains dwarfed. Many of the ossification centres fail to develop. The child is pot-bellied. Genitals remain infantile. The nose is broad and thick. Nostrils are wide open. The tongue is larger than usual. The mouth is kept open. The movement is clumsy, lacking energy and intelligence. Parathyroids are concerned with calcium and chloride metabolism. In parathyroid insufficiency increased excitability of the nervous system (tetany) may be related to the loss of calcium. There is also diminished carbohydrate tolerance. Tetany is a clinical syndrome, due to insufficient function of the parathyroid glands, characterized in its outspoken form by (1) paroxysmal tonic contractions, often painful, usually confined to certain group of muscles, and unaccompanied as a rule by loss of consciousness, (2) paresthesias in the extremities, (3) some trophic disturbances (hair, teeth, nails, lens).

Thymus is antagonistic to gonads, but closely related to the posterior lobe of the Pituitary. It regulates calcium metabolism and structural growth. At puberty it atrophies with sexual development, and it disappears a few years later in adolescence with epiphyseal closure. If a dog is thymectomized a few days after birth, the growth of the animal is retarded, especially the longitudinal growth of the extremities, the bones soften and bend, ossification is slowed, there is little or no callus-building after fracture, lime-deficit develops and dentition is slowed. In castrated animals the normal involution of the thymus is markedly delayed. In human eunuchs, the thymus is known to persist. Excessive sexual activity in early life accelerates the involution of the thymus and brings out the premature epiphyseal closure.

In *Status Thymolymphaticus*, eunuchoid type with tall body, long arms and legs is observed. Males often exhibit a feminine configuration of their extremities. They may exhibit rounded arms and thighs, large mammary glands, broad hips. Beard is feebly developed or there may be a fine down on the cheeks. The hair over the sternum and axillae are scanty. Females assume masculine type. But in both epiphyseal lines remain open for a long time.

It is therefore evident that puberty is more dependent on the synergetic harmonious functioning of Thyro-gonad glands than on age. But as it is a growing period, consequently subject to tension, food should be ample and varied, not only providing materials for bodily maintenance, for repairing its wear and tear, but also for structural growth. It should consist of at least of quart of milk which consists of fats, lact-albumin, but is rich in calcium, meat which contains best assimilable of protein of all amino-acids but also of iron and stimulating extractives, whole-wheat bread or unpolished rice, which are not deprived of their vitamin B₁₂.

and minerals, alkalizing vegetables and fruits for their minerals and vitamins and for their laxative effect

At puberty real education should begin with serious efforts. All savage and ancient races initiated their pubescents with national wisdom at that age. The Hindus perform the *upanayana* ceremony of their boys between the age of 9 to 14 to send them to their preceptors' houses to learn the *Vedas*. The Persis wear their *Koshi*. Ancient Egyptians, Phoenicians, Incas, Aztecs, Mayas, Maoris and Austrians circumcised their pubescents. The Jews and Muslims who adopted this hygienic custom from the ancient Egyptians still practise it. Now a youth has to learn the basic outlines of many modern sciences so that he can specialize in one. For this he has not only to acquire the language of his own country but also a few other dominant languages in which are discussed latest scientific researches and investigations

IV—ADOLESCENCE

Thymus gland does not grow with age like other organs of the body. Rather at birth it is the largest and gradually it is reduced in size and functioning. It regulates the epiphyses, the growing centres of the bones. At puberty it begins to atrophy with sexual development. *Thymus* and gonads are antagonistic to each other. The epiphyses of the humerus join the shaft at about 20, the nucleus of the external condyle appears between 13—17, that of internal condyle joins the shaft at about 18, and other members at 16 or 17. The superior epiphyses of the tibia join the shaft at 17 or 18 and inferior epiphyses at 18. The metacarpal bones and phalanges have epiphyses which join between 13—19. The epiphyses of the clavicle appear about the eighteenth year and join the shaft about the 25th year. The coracoid process of the scapula which ossifies from two centres which join from the 16th to 18th years assist the clavicle in rotating the forelimbs outward farther from the trunk and giving them greater freedom of motion. Structural growth is completed by the union of the sternal epiphysis of the clavicle to its shaft at about 25.

The pelvic region, especially in girls, undergoes important pubertal changes. The five sacral and four coccygeal bones unite from eight to 10 years and are fully fused into one between 15—18. The iliac arches broaden, the Y cartilage, separating the three parts of the hip bone, begins to ossify from several centres about the age of puberty, and the epiphyses about the crest of the ilium unite with the main bone between 23—25 years of age. Complimentary and intercalary bony points develop and join the cotyloid bone between pubis and ilion at 18. There is similar enlargement in the region of the symphysis pubis, and

sometimes so great as to noticeably rotate the neck. Complete pelvic development is rarely attained till well into the twenties for women. Motherhood before the full pelvic development is not desirable. The pelvis of the Caspian, Aryan and Semite is oval, round of the Alpines; quadrilateral of the Mongoloids and Palæ-Alpines, cuneiform of the Negroes.

With civilization sexual differentiation is being increasingly marked, especially in the pelvic development. In primitive societies, men and women are almost alike. But with the advance of civilization, differences of secondary sexual characteristics become prominent.

In apes and lower races of men, the statures of the skull unite first in the frontal, then in the parietal, and last in the occipital region. In civilized man the order is reversed in the progressive development of the anterior lobes. Not necessarily the larger size of the brain evidences higher intelligence. Intelligence is rather co-related with the qualitative organizational integration of the neural cells than their voluminous quantity. But phylogenetically it is observed that larger the head in proportion to its body, higher is the intelligence of the animal. Head form is a racial trait. The Alpines (1460 c c), Palæ Alpines (1430 c c), Mongoloids (1330 c c) are broad-headed (brachycephalics). The Caspians (1450 c c), Aryans, Mediterraneans (1425 c c), Semites, Negroids (1335 c c) and Australoids (1325 c c) are long-headed (dolichocephalics). The greatest skull diameter from front to back increases from six to maturity, growth in length of skull from the glabella to the farthest occipital point is greater not only absolutely, but relatively, and the pubertal increment is more marked, being greatest from 13 to 15 in boys, but continuing at least till 20, but being slower, but more evenly distributed from 12 to 18 in girls. At the vertex, and passing down, there is a gradual increase in breadth of the skull in both sexes, in girls at least to the 18th year, but in boys this development does not seem to be complete at 21. This growth is most rapid in girls from 12 to 15, in boys from 14 to 18. The air cells in the temporal bone are not developed till near puberty, and the styloid process grows with sudden rapidity at puberty, but only joins late in life. The spongy bones which appear at birth join the body of the sphenoid at puberty, when the laminae of the vomer are completely united. The diploe and sinuses of some of the bones of the skull are found growing even after puberty. The basi-occipital may be joined to the basi-sphenoidal bone by cartilage as late as 20th year, when ossification takes and completes the union in about two years.

It is evident therefore that adolescence is not attained before twenty-two, and puberty is not maturity. Structural growth is not interfered with as long as synergetic actions of the glands are in harmonious working.

order. Deficient nutrition may check bodily growth but not stature. Adolescence is the best period of life. Body is reaching its perfection of form and loveliness. Mind is alert and resourceful, optimism and idealism are thrilling the body and mind to conquer and to achieve. Nothing is unconquerable to youth. Nothing is beyond their reach and accomplishment. A youth has evolved out of countless ages of selection is a conquering hero, armed for conflict with power and speed, supplied with muscle and nerve of steel, intelligence and inventive genius, love of sports and sport, of love. An adult maiden's body has been framed with bright youthful eye, comely charming face, coral inviting lips, firm popular breast like cup-shaped roundness, bells with thrilling calls, lithe slender frame, expansive pelvis and hip, all making voluptuous appeals for exercises and arousal, joy and harmony, for the receptivity of the arm of hope, faith, love and life and for maternity.

V—NUTRITION

Our body is a machine—a complicated, finely adjusted machine. Food supplies not only the fuel to generate mechanical energy, but also for growth and reproduction. In the human engine the bones, which may be likened to the cranks of the locomotive, are mainly composed of phosphate of lime and protein matter. The driving machinery consists of the muscles, which are chiefly composed of proteins, and the energy is supplied partly by carbohydrates and partly by fat which serves also a lubricating function in the body as in a motor. Heat, inseparable from life, is the by-product of the functional activities of the body cells. An average adult body of 146 pounds contains 0.24 pounds of Oxygen, 31.6 of Carbon, 14.6 of Hydrogen, 4.6 of Nitrogen, 2.8 of Calcium, 1.4 of Phosphorus, 0.34 of Potassium, 0.24 of Sulphur, 0.12 of Chlorine, 0.12 of Sodium, 0.04 of Magnesium, 0.03 of Silica, 0.02 of Fluorine. Out of 92 elements, 23 are found in the composition of the human body. We need therefore all these chemicals in our food and drink for our bodily maintenance and growth. Vitamins act as chemical catalyzers. Endocrine glandular secretions regulate metabolism of the minerals. Other glandular secretions are chemical digestants and converters of the ingested food stuffs.

Proteins are of primary importance in respect to the phenomena we call life, which can only exist in association with protoplasm which chiefly consists of it. Proteins contain carbon, hydrogen, oxygen and nitrogen; most of them contain sulphur, and some phosphorus. Proteins are formed by the union of amino acids of which about 20 have been discovered. Proteins of our food should contain all these amino acids so that out of their synthesis the body can repair its own wears and tears.

and build up its own tissues. Proteids are converted during digestion into peptone which enters into the blood vessels in the form of albumin by absorption, being transformed in the process of absorption through cellular enzymes of the alimentary canal. Proteins or albuminous foods are found in meat, casein, legumes, cereals and nuts. But all the proteins are not equally rich in those 20 amino-acid units. Most of them are incomplete, lacking a number of amino-acids. Meat alone contains all of them, consequently is the best tissue-builder and most appropriate for growth and vitality. In the case of casein (lact-albumin), *Glycocoll* is entirely missing, and *Cystine*, which is a sulphur-containing unit, is present only in traces. Glycocoll, however, is not of great importance, because the organism can manufacture it for itself out of synthesis of Glyoxal and ammonia. In the case of *Cystine*, which the tissues cannot manufacture themselves, the deficiency has to be made up for by feeding an excess of casein so as to cover the needs of the tissues for this amino-acid. In the case of legumin (vetch), legumelin (soy bean), phaseolin (kidney bean), *Valine* and *Cystine* are lacking and they are deficient incomplete proteids. In Gladin of wheat, Glycocoll is lacking and *Lysine* is present only in a small amount. A still more deficient protein is the *Horden* of barley and *Zein* of maize.

Amino-Acids of Various Proteids

	<i>Casein</i>	<i>Egg A</i>	<i>Gladin</i>	<i>Zein</i>	<i>Legumin</i>	<i>Muscle</i>
Glycocoll	—	—	—	—	0.38	4.00
Alanine	1.50	2.22	2.00	13.39	2.08	8.1
Valine	7.20	2.50	3.34	1.88	—	2.0
Leucine	9.35	10.71	6.62	19.55	8.00	14.3
Proline	6.70	3.56	13.22	9.04	3.22	8.0
Phenylalanine	3.20	5.07	2.35	6.55	3.75	4.5
Glutamic Acid	15.55	9.10	43.66	26.17	13.80	10.6
Aspartic Acid	1.39	2.20	0.58	1.71	5.30	21.3
Serine	0.50	0.00	0.13	1.02	0.53	trace
Tyrosine	4.50	1.77	1.61	3.55	1.55	4.4
Cystine	0.00	0.00	0.45	—	—	trace
Histidine	2.50	1.71	1.84	0.82	2.42	4.5
Arginine	3.81	4.91	2.84	1.55	10.12	1.5
Lysine	5.95	3.76	0.93	—	4.29	7.6
Tryptophane	1.50	trace	1.00	—	trace	trace
Ammonia	1.61	1.34	5.22	3.64	1.99	1.07
	65.49	48.85	85.68	88.87	57.43	99.87

One requires only 1 gram of complete protein daily per each kilo of his body weight, 50 p.c. of which should be of animal origin. If he weighs 50 kilos, he requires daily 50 grams of complete protein. Excess of

protein cannot be stored in the system for future needs, but is converted into fat by a round-about way, entailing strains on the liver, kidney and thyroid. Not only meat is a complete protein, it is quickly assimilated. Its extractives are stimulating for growth. Its cell-nuclei, the carriers of life process, contain abundance of phosphorus and iron. The liver, kidney, sweet breads, endocrine glands, spermatozoa, ova consist largely of nucleo-proteids, and they are exceptionally rich in minerals and vitamins. Therefore meat albumin is very valuable for growing children for its appetizing and stimulating properties. But those whose liver and thyroids are deficient, they should take it in very moderate quantities, otherwise they may suffer from the injurious effects of its end-products. Liver and thyroids are detoxicating agents. Nucleo proteids form *purin* bases during their disintegrating process, and from these uric acid is a by product, and the accumulation of which develops into gout. In experiment on dogs, it has been proved that when liver is excluded from circulation, if meat or meat bouillon is given, symptoms of poisoning develop. Likewise in diseases of kidney meat should be sparingly given. Animals that are killed with tortures produce fright-products—*cratin* which has a toxic effect. The flesh of a well-fed chicken is most tender and easy of digestion of any animals except a few kinds of lean light fish. A plentiful meat diet causes acid saliva which favours the formation of tartar at the neck of the frontal teeth, thus causing their loss (*pyorrhea alveolaris*). Sugar also remaining in the cavities of the teeth by fermentation causes acidity. Thus there may be dental caries.

Fish meat has many advantages over meat of animals. Fish has less extractives, so it can be given to those even whose liver and kidneys are not functioning well. Tender and lean fish is easily digestible. It is rich in phosphorus, particularly its roe and milt. It has the reputation of an aphrodisiac and can be used as a nervous tonic diet for brain worker. However as it is liable to early decomposition, a fish should be killed just a few minutes before cooking. And many fishes are rich in vitamins A, B, C, especially the liver lats of some are exceptionally rich in vitamin A. Of the **Carps** genus, many fishes have taste and flavor as *Jal o rohito* (Rui), *L. calbasu* (Kálbansu), *L. bata* (Bhángá), *L. d'eri* (Karu), *L. nandina* (Nandi), *L. pangusia* (Utti). Of the **Barbus** genus, *Barbus putilora* (Mahseer), *B. dukai* (Bharkula), *B. sarana* (Sarna panti), *B. (catla) catla* (Kátala), *B. (Cirrhina) mrigala* (Mrigál) are popular. **Cat fishes** (Siluroidea) are given as food for invalids, being able to breathe air they can survive for a long time out of water. *Clarius batrachus* (Mágura), *Heteropneustes fossilis* (Singi), *Callistius pabda* (Pábdá), larger varieties living in river are *Wallago attu* (Boál, not a clean feeder, so unpopular), *Eutropichthys tacha* (Vácha), *Pangasius pangasius* (Pángási), *Silona silondia* (Silang). Of the **Bagridæ Family** *Mystus*

cavasius (Tengra), *M seerghala* (air), *M vittatus* (Air Tengrá), *Rita rita* (Rita) *Bagarius bagarius* (Bághá Air), *Erethistes elongatus* (Bot-tengrá), have firm flesh and good taste. Of the **Perches** *Ambassis nama* (Chándá), *Anabas testudineus* (Koi), *Badis badis* (Bhedá), *Glossogobius giuris* (Bhahá), *Nandus nandus* (Nándvos), *Trichogaster chuna* (Chuná khalisá), *Trichogaster fasciatus* (Khalisá), are small light fishes, Of the **Murrels**, *Ophiocephalus* (snake-headed) *amphibius* (Bara ching), *O gachua* (Chung), *O marulius* (Gajul), *O punctatus* (Lítá), *O striatus* (Saula) are mud fishes. Their livers are very rich in a vitamin A. Of the estuarine **Harrings** *Gadusia chapra* (Khavará), *Hilsa ilsha* (Ils) are fatty fishes. Of the **Feather-Backs** *Notopterus chitala* (Chitala) *N notopterus* (Phalui) are tasty. Of the **Crustaceæ** *Homarus vulgaris* (lobster Galdá chingri), *Crangon vulgaris* (Shrimp Bagdá chingri), *Panulus V* (Praws chingri), *Cancer esculenta* (crab) contain lecithin and iodine, but they are hard to digest. Eels are very tasty fishes, though they are foul feeders. Their fat is also rich in vitamins A D. *Mastacembelus armatus* (Bháyin), *M pancalus* (Pínkíl), *Rhynchobdella aculeata* (Goichi), *Amphipneus cuchia* (Kuchiyá) Fishes generally contain 13 to 21 p c of protein. Of these *Heteropneustes* (*saccobranchus*) *fossilis* (2.26 p c in mgrn), *Hilsa* (*clupea*, *ilsha* (2.33), and *Mystus cavasius* (2.03) are very rich in iron. Man thrives best if he takes the similar substance of which his body is composed and the tissues of animals and fish resemble his. And sea fishes are particularly rich in iodine. Fish liver oils are a good source of vitamins A and D. And fat-soluble vitamins in the livers of some fish have made fish diet of great nutritional value.

	<i>Proteids</i>	<i>Carbohy</i>	<i>Fat</i>	<i>Cellulose</i>	<i>Calcium</i>	<i>Iron</i>	<i>Phosph</i>	<i>A</i>	<i>B</i>
Rice (unpolished)	7.5	76	0.6	0.6	0.03	1.04	0.28	16	64
Rice (polished)	5.9	76	0.4	0.4	0.01	.50	0.8	0	20
Rice (par-boiled)	6.8	76	0.5	0.5	0.02	1.1	.18	10	50
Rice (puffed)	7.2	73	0.1	0.2	0.02	1.2	.16	—	60
Wheat (whole)	11.2	67	1.2	2.2	0.05	.04	—	200	150
Wheat (white)	10.7	80	0.7	0.3	0.2	.01	—	0	22
Barley	12.29	69	2.44	0.9	0.03	2.5	0.23	—	150
Maize (tender)	4.3	15	0.5	—	0.01	0.7	0.11	42	—
Corn	10.2	69	2.3	2.1	0.01	2.1	0.33	—	—
Oats	10.9	59	4.5	12.0	0.03	1.2	2.5	250	150
Oat Flakes	13.9	67	6.2	1.7	0.02	1.1	2.4	240	145
Gram (Mung)	24	56	1.3	3.50	0.14	1.92	0.25	64	140
Gram (Más)	24.2	60.2	1.5	3.02	0.20	2.8	0.30	158	155
Peas	19.7	56.6	1.1	5.50	0.67	0.86	0.30	150	—
Lentils	15.1	59.7	0.7	3.92	0.03	2.64	0.25	450	150
Beans	24.6	55.7	0.7	5.60	0.06	0.32	0.45	—	—
Soya Bean	44.2	20.9	19.5	2.80	0.24	6.16	0.60	710	300

Carbohydrates are energy-producing foods. As protein builds up and repairs worn-out tissues, carbohydrates by their oxidation produce energy. It also saves the intake of protein and fats. The best sources of carbohydrates are wheat, rice, barley, corn and oats which are the staple foods of man, though potato, banana and some tubers (as yams, *colcosia antiquorum*) sometimes take their place. **Legumes** hold an intermediate place as they are both rich in carbohydrate and proteids.

The white wheat flour is made by crushing the wheat grain between a series of rollers instead of grinding it between two rotating stones as in ancient times or in primitive societies. In roller crushing the wheat germ is flattened into a tiny disc, and does not become pulverized as does the mass of the starchy material, forming the greater part of the grain. The wheat germ, the most valuable, fatty and mineralized, rich in vitamin E, lack of which may lead to abortion, is held back when the crushed grain is sieved, and consequently the refined white flour is much poorer in protein, fat, minerals and vitamins. Whole wheat bread is therefore desirable, though it looks a little brownish. Its bran contents are anti-constipative. Rice also in its polishings of the outer *silver coating* loses most of its phosphorus, iron, vitamin B₁, the loss of which causes polyneuritis and beriberi. The rice is parboiled, it is dried in the sun and the husk is removed. This parboiling process gives vitamin B₁ of the cuticle in the rice berry. But though rice is the staple and the best and cheapest carbohydrate food for the toiling millions of Asia, it is often irrationally cooked, and thereby loses much of its nutritive value. Rice is at first soaked and washed in water which removes some of its minerals and soluble proteins. Then it is cooked in a potful of water. When the rice cellules have been inflated and softened, the water is drained off which removes much of the soluble protein, minerals and some of carbohydrates. This rice is nothing but an inflated carbohydrate granules, confined within burst cellules. It is insipid in taste. And being demineralized, unless additional proteids, vegetables, fats and fruits are taken with it, it will cause malnutrition and beriberi.

Though **legumes** are very nutritious, being both rich in proteids, carbohydrates, even lecithin, but they are not easily assimilated as their nutrients are confined within cellulose. Animals in their large *cæcum* have a special ferment *celase* to digest cellulose. But human beings have no such enzyme. Only intestinal bacteria and fermentative fungi eat them up, liberating no doubt about 30 p.c. of the nutrients, by the cleavage of the cellulose, producing thereby also as by products lactic acid, butyric acid and an excessive quantity of gas. Sulphur contents also produce flatulence. It however stimulates intestinal evacuations. Legumes also contain lecithin and purn bodies. Various kinds of *soya bean* curds, sauce, cheese can be made, which are tasty and nutritious.

Fats not only generate heat, being very rich in calories, but also lubricate our mechanism. The standard of heat production is *calorie* which means the amount of heat required to raise 1 kilogram of water 1°C . Combustion inside the body is precisely the same as combustion in an ordinary furnace and the heat value of 1 gramme of fat is 9.3 calories, carbohydrates 4.1, proteid 4.1. In a cold country therefore a large quantity of fat is necessary to keep the body warm. In a tropical country its requirement is less. Solid fats have to be fluidified and digested before they can be absorbed. And lower the melting point of fat, it is more easily assimilated. Any fat which melts above 40°C as lamb, goat, beef or pork fat is very hard to digest. Fish oils, vegetable oils, and especially cream which consists of separate small globules, rich also in vitamins, are easy to digest. Cottonseed oil contains only 0.29 p.c. fatty acids. *Steapsin*, a ferment of the pancreas, activated by the bile, splits the fat into glycerine and fatty acids. The glycerine is soluble, and the fatty acids are converted into soapy substances by the salts in the bile together with the alkaline compounds of the intestine. After their absorption by the intestinal mucous membrane, they are synthetized again into body fats. If bile duct is occluded by gall stones, the greater part of the fat remains in the intestine, undigested and unabsorbed. Therefore in hepatic deficiency, only light oils like the olive should be given sparingly. Peanut, coconut, cotton seed, soya bean oils are fine heat-producing fats. But oils lack vitamins and minerals.

Vegetables are needed in the diet, for they not only add varieties to our palatable dishes, but by their mineral contents and vitamins they alkalize our blood. The end products of proteid and carbohydrate combustion are acid residua. Blood is alkaline. If its alkalinity is reduced, body becomes susceptible to disease germs and organic disharmonious functionings. Vegetables not only add taste and flavour, but they by their rich alkaline contents alkalize the blood and tissues. They also by the ballast of their cellulose act as an intestinal laxative.

Papaw (*Carica papaya*) either as a green vegetable or as a fruit is valuable as it contains a milky juice which when dried constitutes *papayotin*. The active principle is an enzyme, a proteolytic ferment called *papain* which assists the digestion of meat by its action upon the sarcolemma whereby it exposes the albuminous or sarcous elements to the influence of the pepain. **Potato** is a very valuable and a good source of carbohydrates. But unlike other carbohydrates, it alkalizes the blood and urine. No wonder therefore that it is generally taken with meat which leaves acid residuum. In one kilo of potato there is contained almost as much alkaline substance as in one liter of vichy water. Besides it contains 0.01 p.c. of phosphorus and 0.22 p.c. of phosphoric acid. And even cooking destroys only part of its vitamin C content. **Onions**

contain albumin, gluten, mucilage, uncrystallizable sugar, phosphates, acetates and citrates of lime, soda, potash, iron, magnesia, with organic acids and an acrid volatile oil as in garlic *allyl sulphide*. Onion is stimulant, diuretic, expectorant and laxative. **Tomato** (Aztec *tomatl*) contains 4 to 5 p. c sugar. Owing to its fine flavour, and its content of citric (0.7 p. c), malonic (0.8 p. c) acids it stimulates the liver, and its carotene is rich in 14160 units of vitamin A and 15 units of vitamin C. Sea weeds and vegetables grown near sea-side are rich in iodine. Thyroid regulates the metabolism of iodine and calcium and phosphorus, spleen of the iron, adrenals of sulphur.

Vegetables	Water	Cellulose	Fat	Salts	Proteids	Extractives	Carbohydrates
Potato	74.39	0.75	0.15	1.79	1.45	—	20.86
Cabbage	90.0	1.84	0.2	1.2	1.9	2.58	2.29
Cauliflower	90.3	0.87	0.38	0.8	2.53	3.70	1.27
Onions	86.0	0.72	0.04	0.7	1.59	8.06	2.87
Carrot	88.2	0.89	0.89	0.9	1.05	8.09	2.01
Beet	87.3	1.07	0.04	0.9	1.36	9.10	9.54
Tomato	92.4	0.82	0.10	0.3	1.0	2.9	3.9
Okra	87.2	2.03	0.2	1.27	1.60	3.8	7.70
Eggplant	84.2	1.70	0.3	1.3	1.30	2.45	6.4
Spinach	91.0	0.77	0.54	1.9	3.15	3.26	0.10
String beans	88.75	1.18	0.14	0.6	2.72	6.80	1.16
Papaw	78.8	2.37	0.18	1.8	2.8	3.7	5.70
Pumpkin	85.2	1.50	0.25	0.8	1.10	3.20	6.35
Raddish	86.92	1.55	0.11	1.7	1.92	3.10	1.53
Colocasia	65.2	2.1	0.1	—	3.00	7.20	22.1

Vegetables	Potash	Sodium	Calcium	Magnesium	Iron-oxide	Chlorine	Phos.	Sulphur
Potato	60 p. c	2.96	2.64	4.93	1.10	2.46	16.80	2.4
Cabbage	22.14	12.10	27.88	4.44	0.10	13.68	3.88	15.31
Cauliflower	26.37	10.24	18.68	2.30	0.30	6.07	13.08	11.41
Spinach	16.56	35.24	11.87	6.38	3.35	6.29	6.82	4.52
Radish	21.98	3.75	8.78	3.53	1.16	4.90	41.12	—

Fruits by their citric, malic and tartaric acids stimulate the liver. Their aroma and fine flavour rouse appetite. Their acids however undergo certain chemical changes within the body and become alkaline and thereby alkalize the blood. Fruit enzymes aid digestion. Fruit sugars are energy-producing. **Grape-sugar** (*glucose*) occurs in many vegetables and fruits. Of 6.39 p. c. of sugars in pumpkin, 4 p. c. is grape-sugar and 1.50 p. c. cane sugar. Grapes contain 10 to 25 p. c. of glucose, dried figs 60 to 70 p. c., cherries 11 p. c. **Fruit-sugar** (*fructose*) consists mainly of dextrose, and in some kinds—dried raisins and prunes—it becomes gradually dried into a crystalline mass, but in others the *dextrose* is converted by means of an enzyme into an uncrystallizable invert sugar (*levulose*). Invert sugar (levulose) is an uncrystallizable sugar occurring

in vegetables and fruits as in plums and peaches in conjunction with *Dextrose*. Digested starch is transformed into grape-sugar (dextrose or glucose). This then is carried into the liver by the portal vein, and the sugar is there stored up as glycogen. Glycogen is comparatively indiffusible, and is converted into *dextrose* for use in the body by a ferment diastase in the liver. *Can-sugar* (sucrose) occurs in many plants as sugar cane, beetroot, palm-juice, maple tree. It is convertible into dextrose and levulose. Apples contain 13.4 p.c. of sugars, Apricots, 6.66, Banana, 36.4, Cucumber, 2.8, Dates, 67.3, Fresh Figs, 8.30, Dried Figs, 65.1, Grapes 10.2, Guava 14.5, Jambu Plum, 19.7, Water Melon 3.8, Mango, 11.8, Orange, 10.6, Ripe Papaya 9.5, Peaches 7.6, Pears 11.5, Pine-apple 12.0, Pomegranate 14.6, Shaddock, 10.1. cream of green coconuts contains proteids, fats and iodine. Fruit jams and jellies through cooking lose their vitamins but retain their minerals. A piece of pineapple taken at the end of a meal aids digestion as it contains a proteolytic ferment capable of converting albuminates into peptone. The juice in doses of a tablespoonful or more is beneficial in cases of chronic bronchitis, attended by the secretion of tough and tenacious mucus.

Fruits	Sugars	Protein	Fat	Salts	Potash	Calcium	Phosphorus
Apples	13.4	0.3	0.1	1.75	40.85	8.85	9.70
Apricots	6.66	0.9	0.1	4.21	61.80	2.95	11.80
Banana	36.4	1.3	0.2	2.45	35.60	—	18.20
Cucumber	2.8	0.4	0.1	—	45.20	7.50	26.30
Figs (fresh)	8.30	1.3	0.2	2.92	55.83	15.72	12.72
Grapes	10.2	0.8	0.1	3.95	51.99	6.91	21.27
Guava	14.4	1.5	0.2	—	32.75	5.84	12.32
Jambu plum	19.7	0.7	0.1	2.08	48.20	11.2	10.12
Melon	7.5	0.5	0.2	0.04	52.70	—	5.12
Mango	11.8	0.6	0.1	1.6	45.30	7.32	12.8
Orange	10.6	0.9	0.3	2.73	2.73	12.82	12.62
Papaya (ripe)	9.5	0.5	—	1.08	42.7	20.37	10.80
Peaches	7.6	1.5	0.2	1.12	—	5.37	12.10
Pears	11.5	0.2	0.1	1.62	58.60	5.60	11.80
Pineapple	12.0	0.6	—	3.80	60.10	7.30	8.10
Pomegranate	14.6	1.6	—	2.87	58.10	7.20	12.80
Shaddock	10.1	0.6	0.6	2.80	52.8	15.72	10.12
Dates (dried)	66.2	4.6	2.0				
Apples	49.1	1.4	3.0	The milk and cream of green coconut contain a little iodine, and the cream in addition some proteid, fats and sugars			
Raisins	75.1	2.3	4.8				
Prunes	66.1	2.5	0.8				
Coconut	27.7	5.7	50.5				
Peanuts	24.2	25.7	28.6				

Milk contains 3.40 p c of casein, 3.68 of fat, 4.98 of sugar, of which 3.19 of casein, 3.49 of fat and 4.84 of sugar are assimilated. The assimilation is better accomplished in children than in adults. Of the nutritive salts of milk 2.465 p c is of Potassium oxide, 8.18 p c of Sodium oxide, 22.42 of Calcium oxide, 2.59 of Magnesium oxide, 0.29 of Iron sesquioxide, 2.52 Sulphuric anhydride, 26.28 of Phosphoric anhydride, 13.95 of chlorine. Milk is the nearest approach we possess to a perfect and complete food. And no other single food is known that can be used as its substitute. More than any other food it contains the elements, essential for life and growth. It is essential not only for babies, infants, old age, but even for expectant and nursing mothers. It is the medicine for the sick, especially in hepatic and renal deficiency.

Eggs contain about 12.50 p c of albumin, 12.02 of fat, 0.67 of extractives, and 1.70 p c of salts. The yolk of the egg contains 63.8 p c of Phosphoric acid, 8.93 of Potash, 11.1 of Calcium, 5.12 of Sodium, 1.19 of Oxide of Iron, 1.23 of Sulphuric acid, 1.07 of Magnesium, 0.55 of Silicic acid. The yolk contains 7.2 p c of Lecithin. It also contains a brain substance—*Protagon*—which is decomposed into cerebrin and lecithin, so building up the central nervous system. Eggs contain also a trace of arsenic, duck's eggs have more of it than those of chickens. These important mineral salts as phosphorus, iron, lime, silicic acid are absorbed in organic forms. Fat contained in the yolk is a rich source of vitamins A, B, C, particularly of B and D. Vitamin D, whose physiological function is to secure the retention in the body of the lime salts and phosphorus, acts with much greater economy when these salts are present in great abundance in the diet.

Vitamin B₁ (water-soluble) is essential to the proper nutrition of the nervous system of man and vertebrates. In its absence symptoms are neuritic and polyneuritic: inanition, gastric irritation, emaciation, swelling of legs, chest and face, burning pains, muscular wastage, disturbance of the heart's action. Mammalian liver eggs, milk, legumes, fresh or cooked green vegetables, pericarp and germ of rice, wheat, barley are rich sources of Vitamin B₁. Though B₁ contained in rice is capable of withstanding the temperature of boiling water for one or two hours it is readily inactivated when its solution is heated under pressure at 120°C at which temperature B₂ (Pellagra-preventing Vitamin) is scarcely affected. Lactoflovin is the chemical name for Vitamin B₂. It is a greenish yellow pigment in whey. It occurs in liver, kidney, yeast and many yellow vegetable products. It is an indispensable nutrient, since animals deprived of it sicken and die. The Vitamin A accelerates growth and weight and acts as an anti-infective agent. Deficiency in Vitamin A (fat-soluble) result in malnutrition, retarded or dwarfed development and diminished resistance to infection of eye, ear, nasal sinuses, glands,

ardent adherents of the state. Education does not consist of a few hours teaching in class rooms. Its roots sink much deeper into the national life as the plant roots penetrate into the soil for nutrition, suction of sap and sustenance. Nurses and teachers of infants must have special training so that they can efficiently discharge their duties. History shall be taught in story forms. Natural phenomena may be explained in non-technical terms within the easy comprehension of the child's mind. Butterflies and insects may be collected. Flowers may be cultivated. Pet animals may be kept. Child's interests have to be awakened in different directions. Elders should behave before them which they may imitate by following their examples. Initiation is one of their main traits, and that should be the principal focus of their educative principle. Disciplinary and regular habits have to be fostered by discriminative approbation, and not through chastisement. Personal hygiene, sanitation, dietetics and manners are to be taught both by examples and precepts. Children should be sent to the infant school from the age of seven to twelve.

Secondary Schools should be situated on the fringe of forests with open play grounds, gymnasiums, flower, vegetable and horticultural gardens, lakes for swimming and pisciculture, workshops and model agricultural farms containing an area of about 50 acres. The pubescent are passing through nomadic feral savage cycle of their psychic existence, and therefore their surrounding should be similar. They should have ample opportunities for hunting, fishing, canoeing, riding, dancing, cutting trees, making picnics, roads, bridges, and outhouses, thus developing muscular power, physical vigor and hardihood, agility of movements, resistance to exposures and fatigues, leadership and self-confidence. But the structural differences after puberty are biological facts. So games and vocations are to be arranged in such a way as to suit the sexes, keeping in common as many as possible without detriment to their health. Pubescence is the age of romantic dreams and idealization. So to enthuse the imagination and intellectual curiosity, outlines of history, civics, general science (particularly chemistry and physics), natural history, hygiene, accounting and astronomy should be taught. Physics and astronomy will broaden mental horizon, while chemistry and accountancy will inculcate in the mind lessons of accuracy and precision. Physio-geography, ethnology and anthropology should be taught with the aid of films. Students should be taken to excursions periodically to places of historical, political, industrial importance, and especially to scenic spots where the formation of glaciers, rivers, lakes, glens and valleys can be graphically explained. Students in their tours will be fed, entertained and accommodated in the public schools. Thus travelling expenses will be reduced. Wherever possible students should travel on foot. So that in easy marches pleasure and experience may be combined with physical exercise.

and power of endurance. It will also engender the love of the country, practical contact with the people, realistic view of political and economic problems, co-operative fellowship and spirit of hospitality.

There should be separate dormitories for boys and girls which they shall themselves manage under the superintendence of competent teachers. They themselves shall purchase their food-materials and other needs, and do the cooking, cleaning and serving by rotation. But they shall be paid for their service. Though the boarders shall have the choice of many alternative dishes, the food menu shall be made by the school dietician. Teachers shall live with their pupils to guide and instruct the pupils and show them the right conduct, manners and discipline by their personal examples. Each one of the students would have to learn a trade in the workshop according to his or her personal inclination, animal husbandry, poultry-raising, dairying, pisciculture, farming, horticulture or gardening. The profits of their sale proceeds shall belong to the workers. Thus aimless plays shall be gradually replaced by an outdoor vocational training, productive physical exercise and utilitarian service. With puberty sexual consciousness is roused. It may even be prematurely awakened by observing the marked differentiation of the sexes, pairing of birds and animals. In pre-pubescent days the utility and economy of sex functioning may be easily explained without rousing any morbid curiosity, through the lessons of botany, fishes, amphibians and animals, as the fertilization of pollens by stamens has been brought through gradual differentiation of the sex. Thus pubescents should be prepared for pubertal changes. And menstruation and nocturnal pollutions instead of being dreaded as awful scaring unwelcome guests, rather shall be welcomed like the vernal breeze as the signs of new physical and psychic inflorescence. And personal and sexual hygiene shall be taught. The value and importance of sexual continence until full adolescence is reached should be emphasized for physical and mental development. Sexual abuses as masturbation, pederasty, sodomy should be warned against, but without over-painting their evil effects in lurid lights. Dangers of venereal infection in consequence of promiscuous intercourse and their multifarious evil consequences shall be brought to the notice of the pubescents as red signals of warning.

As far as possible the school shall try to be self-sufficient to supply its own requirements. It has to manufacture its own furniture, stationary goods, and try to supply the requirement of the neighborhood whenever practicable. It has to generate its own electricity, supply the currents to its premises, and make all the wirings and electrical repairs themselves. By wind-mills, sun-mirrors and waterfalls, power has to be generated to pump waters from the tube-wells or rivers to be supplied to the premises, all the plumbing works being done by the students. Sewerage disposal

has to be attended to in a sanitary way. The school has to supply its own masons if any new structure has to be added. Students shall attend to the sanitation of neighborhood, and build roads and bridges if required. The school must be an inspiring centre, containing model work-shops, vegetable, fruit, flower gardens and farms, and particularly by the exemplary conduct of the self-reliant student inmates, which the whole neighborhood would imitate and whose counsel it will seek for its own guidance. The students shall gather all the statistics of marriage, birth, death, prevalence of diseases, anthropological and ethnological data from the allotted surroundings. There shall be a Botanical and Natural History Museum collected by the students. The students shall also manage a Bank themselves under the supervision of the teacher of a county. All the school income and expenditure would have to go through it. All the income of the students and teachers through their personal labor or from home allowances should be deposited here and withdrawn by checks. This will inculcate sense of economy and banking habits. There shall be a *Circulating Library* from which not only the scholars but also the neighboring villagers may be allowed to borrow books by depositing a fixed sum against the loss of loaned books and paying a copper for each book that is issued as a compensation for its wear and tear. Man appreciates what he pays for. The readers will be careful to select useful books if they have to pay something for them.

Graduate Course in a college should be for three years in subjects like medicine, law, general science (chemistry, physics and astronomy), engineering—civil, mechanical, electrical, marine, aeronautical, chemical manufacturing hydraulic natural history biology (including experimental psychology), sociology (including anthropology and history). Each college should specialize only in one or two subjects. Scholars would have the option and right to study different branches of the subject wherever they choose, either in other colleges in the same town or another province as physiology in one college bio-chemistry in another, pathology in a different province. Professors would be paid only a nominal salary from the college. Their income would be supplemented by the fees from the scholars they can attract to their classes. They would also receive honorarium from the state annually for each of the meritorious scholars they can produce. **Post-graduate** courses would be only for two years in specialized subjects like astronomy, physics, chemistry, metallurgy, aeronautics marine engineering, biology etc.

The University, under national and state academy, will be a research, teaching and examining body. The university as a body of learning is to be universal in its outlook, world-wide in its interests, but has to be national in order to be effective. Not a branch of learning will escape its attention. As an examining body it will standardize the culture of

the country. Its graduation and post graduate titles would entitle the degree-holders to state service, according to their merit, thus eliminating political spoliation and favoritism, and introducing in their place efficiency and competitive spirit of improvement. The university shall have model schools and colleges in all departments of knowledge as examples of efficiency for other institutions to imitate. For human progress it is necessary that its adolescents have to acquire the fundamentals of achievements of all peoples in all ages, particularly in their own lines so that they can improve on them. New scientific invention is no mere lucky coincidence of intellectual gambling. It is the result of ceaseless persistent labours based on original thinking and improved technique. Science is nothing but systematic observation. In this scientific age, therefore, original thinking in a rational way is more needed than anything else. University is to foster that spirit of enquiry. If it fails in rousing that response in the scholars, it fails in its task. Education then becomes like painting the body with marks as in primitive religious ceremonies, full of decorative effect and show, but of very little utility.

VII—PUBESCENT HYGIENE

In this pubescent period when bones, muscles and nerves are in constant tension under the stress of increasing growth, food should be optimum and varied, richly albuminous, nearly 50 p.c. of which should be of animal origin, a quart of milk, plenty of vegetables for their mineral salts and fruits for vitamins. Food should be easily digestible. Constipation which tends to pelvic congestion, and thereby sexual erethism, is to be avoided. Evening meal should be taken early. It should be light and dry consisting of milk, biscuits and fruits. Drinking excessive fluids, even milk, has to be avoided in the evening and at night, as it leads to full-bladder which by distension causes erection and nocturnal involuntary emission. Open air games and exercises are desirable. Walking is a good exercise. Swimming is also good, if proper precautions are taken against chills. But riding and bicycling are undesirable as they lead to pelvic congestion. Sitting cross-legged has to be avoided for the same reason. Prolonged voluntary retention of the urine and faeces, resulting in over-distention of the bladder and colon, is injurious to both boys and girls, as it may cause erection, involuntary emission and sexual excitement in youths, as well as may displace the uterus. Six or seven hour's sleep is sufficient. One should sleep in a well-ventilated cool room. Bed should be hard and unyielding, and the bed covering should be light so as not to press over the body and produce excessive heat. Soft bed inclines one to remain long in sensuous luxury, even after awakening, a tempting time for youths. Rising up early before sun-rise is a good habit which should be practised regularly. Novels, pictures or cinemas which may

give rise to erotic reverie or sensual excitement must be forbidden. Cold shower baths dampen sexual ardor. Genitals should be thoroughly washed and cleansed after each evacuation and urinal discharge. Especially during menstruation strictest cleanliness must be observed. The external genitalia and pubic hair should be cleansed at least three times daily of the adherent blood, with lukewarm water in which a little soda bicarb and eau de Cologne may be added. Otherwise menstrual blood easily decomposes, especially in the summer, and causes a repugnant odor. The escaping blood should be received by sterilized absorbent cotton wool or pads, fastened to a belt around the abdomen, to avoid soiling the thighs and underwear. Such cotton should be burnt after use. A thorough cleansing full bath should be taken after menstruation ceases. During the period, rest is healthful as active movements produce hyperæmia of the genital organs, sexual excitement and loss of sleep. Pubic hairs should be also regularly shaved as they may form the nids of *Pediculus pubis* and *ascarides*. Irritation of the vulva may be caused by soiling it with urine, feces, dust, decomposition of the menstrual blood, irritant discharges of the genital mucous membrane. Even the fastidious not infrequently fail to clean the smegma beneath the prepuce and the interlabial grooves. This may cause itching of clitoris which is sought to be relieved by rubbing, thus leading to masturbation. In **Congenital Phimosis** the orifice of the prepuce of the penis may be so narrow or redundant as to retain some urine. As the prepuce cannot be retracted for cleaning and removing the smegma præputii, the secretion of the glands of Tyson, they by decomposition provoke phimosis and balanitis with their attendant heat, itching consequent crethism with frequent erections, lascivious dreams, seminal emissions, and incontinence of urine during sleep. They seek relief of itching by masturbation or by coitus. Even when prepuce is capable of thorough retraction, if the glans penis is not cleaned of its accumulated smegma and by its decomposition with acid urine, it may provoke phimosis. Circumcision is a good practice. It was adopted as a hygienic measure by the ancient Egyptians, and it has been sanctified by the Hebrew and Islamic religions. Circumcision not only facilitates the removal of smegma which naturally accumulates under the foreskin and the removal of the urine, the excitability of the glans penis is considerably reduced by its induration. Consequently it prolongs *vita sexualis*, exercises a restraining influence of masturbation, and reduces vulnerability to venereal infections. With modern antiseptics, local anæsthetics of cocaine solution, surgical operation of circumcision has been made very easy. The penis should be thoroughly cleansed with soap, and then washed with alcohol. If pubic hair has appeared, it should be shaved. If prepuce is retractile, it should be drawn forward over the glans. Then by means of a pair of

blunt-pointed scissors or a bistoury with long blades an incision is made in the middle line on the dorsum of the penis. The prepuce then appears like two flaps which must be cut off and trimmed with the scissors following the line of obliquity of the glans. The trimming of the flaps may be facilitated by the use of curved forceps applied so as to leave out the portion that is to be removed. It is necessary to be careful that the two flaps of the foreskin are symmetrical, that too much tissue is not taken away and the frænum is left intact. It has also to be remembered that the prepuce consists of two folds of integument, separated by a very loose connective tissue, that cover and protect the glans penis. They meet and become continuous at the preputial orifice or end of the foreskin which is usually the narrowest part of the prepuce, although sufficiently large in adults to allow the prepuce to be retracted so as to expose the glans. At birth the prepuce is longer than the penis and its orifice narrow, often preventing exposure of the glans, so that a greater or less degree of phimosis is pretty constant. The inner surface of the prepuce at this time embraces the glans closely, especially at the corona where there is a little circle of adhesions. Sometimes the prepuce and penis are adherent over a much greater extent of surface, either in little patches at various parts of the glans, or from the corona to the meatus. The adhesions are generally easy to subdue, partaking more of the nature of agglutination than of firmly organized tissue. But they are apt to be a source of local irritation and to cause the retention of the secretion of the glands of Tyson - smegma præputii. It occasionally happens that the prepuce is imperforate, and the child cannot pass any urine. Then an incision has to be made, and circumcision is deferred to a latter period when it may be unnecessary to do more than trim up unsightly flaps. A few erections in pre-pubescence rupture a part of congenital adhesions. At puberty the glans increase in size, erections become more frequent, and usually destroy any remaining adhesions, while they dilate the preputial orifice so that congenital phimosis generally disappears. When the foreskin is not retractile, the prepuce should be drawn well forward and the clamp or forceps is applied not in a vertical direction at right angles with the long axis of the penis, but in oblique position, following the line of obliquity of the glans. When the clamp is on it is necessary to examine the skin of the penis to see that too much of the tissues will not be taken away and that the organ in erection will not be interfered with or drawn backward. Then local cocaine anæsthesia may be produced. Traction on the distal end of the prepuce by a ligature or forceps is now made, and a straight bistoury is introduced through the middle of the prepuce, the flat of the blade resting on the clamp. An outward cut is then made and a second inward cut removes the cutaneous layer of the prepuce. Some cocaine solution is then

poured over the bleeding surface. Then mucous layer of the prepuce is retracted and the length and condition of frænum are ascertained. The parts becoming anæsthetized a ligature is run through the mucous layer, and traction is made by it, and the forceps is applied in the same oblique manner to this part. The second incision is then made in precisely the same manner as the first was. It is necessary to crowd the glans backward somewhat, but $\frac{1}{4}$ to $\frac{1}{2}$ inch of mucus of the prepuce and frænum should be spared. Otherwise there may be discomforts during erection. Then incised mucous and cutaneous layers and their edges are properly coapted, and the sutures of fine silk or catgut should be put at a distance of a sixth of an inch from the mucous membrane so that no connective tissue will be exposed between the cut edges. By these quite numerous sutures all bleeding is prevented and prompt healing is produced. The parts are then dusted with iodoform and well-bandaged with absorbent gauze. The first dressing may, owing to oozing, have to be removed on the third day and then replaced by a similar one. But if the dressing is clean and the circumcised is comfortable, it may remain longer. Hemorrhage and sepsis have to be prevented. Circumcision should be made before erection takes place. The Hebrews operate on the eighth day, while the Muslims wait until the tenth or twelfth year. The operation consists essentially of three parts: circular section of the extremity of the prepuce, tearing of the remainder of the prepuce to the corona, and denudation of the glans, and suction of the wound and penis by the operator. Hemorrhage is arrested by styptics, powdered coral, or generally tannin and simple dressings are applied to prevent the inner layer of the prepuce from again covering the glans penis. Prepuce was possibly developed to protect the delicate and sensitive glans penis from thorns, prickles, and bites of insects.

Hymen a fold of mucous membrane, springing from the periphery of the vaginal orifice, separating as a perforated diaphragm the vagina from the vulva, is analogous to the prepuce of male penis. In some cases the hymen is exceedingly thin and delicate so that it is liable to be torn if handled at all roughly. It may be elastic or firm and thick interlaced with connective tissue in which case in rough defloration there may be extensive lacerations and tears extending longitudinally along the vaginal wall and sometimes attended with profuse bleeding. In the infancy of the human race sexual intercourse took place very early. Hymen was developed either to engender frictional pleasure in coition with a small penis or to prevent conception in intercourse with a young, old or debilitated man whose penis is small, feeble or of not strong erection. Though in the first act of coitus the hymen is as a rule torn in several directions, and in consequence there is moderate bleeding and pain, yet in some cases hymen may be distended to a great extent and thus

accommodate the full penis, and conception takes place without the hymen being torn. It proves that though uninjured hymen is the most trustworthy sign of virginity, it is not the positive evidence, as there are cases on record where the hymen has been distended and conception even has taken place. Rupture of hymen does not necessarily prove that it has been torn during sexual congress. It may be torn by fall, especially a fall which brings the external genitals in contact with a hard body or by rough handling through finger or by masturbation. Besides the intact hymen other signs of physical virginity are that the labia majora are elastic in consistence and are in close apposition with one another, the labia minora or nymphæ are covered by the labia majora and are but little pigmented, the vestibule and the vaginal orifice are narrow, and the vagina itself is narrow, tense and markedly rugose. The mental purity and idealism of budding womanhood are better symbols than physical signs of virginity. And there is no reason why the brides in their bridal night of pleasurable ecstasies should be subjected to tortures, bleeding and pain. Hymen may be torn by fingers as in China by mother during infancy without any inconvenience. Moreover an imperforate or cribriform hymen, by the hindrance it offers to the passage of the menstrual discharge, is liable after puberty to give rise to serious disorder and pathological tumors. Defloration is sometimes so painful that it was often performed by priests or by stone phallus in ancient times, instead of associating the painful act with the lover's first connubial embrace, which should be remembered with remembrance and joy.

Menstruation is the expression of a periodically recurring wave-like ascending and descending change in the ovarian function which manifests itself in the human female after the age of puberty by the discharge from the genital organs at regular four-weekly intervals of blood-stained mucus. The menstrual blood is always fluid, and rarely contains fibrinous clots, and is always mixed with a larger or a smaller quantity of mucus which gives it a sticky character of alkaline reaction and characteristic smell. It is composed of 17.5 of solids and 82.5 p.c. of liquids. The solid constituents are 6.4 p.c. blood-corpuscles, 4.8 of albumin, 4.5 of mucus, 3.9 of fat, 1.2 of salts, 1.1 of extractives. The menstrual period varies in different women from 3 to 6 days, but the same duration recurs regularly at each successive period in the same person in about 93 p.c. cases. The duration lasts 3 days in 40 p.c. of cases, 4 days in 16 p.c., 5 days in 12 p.c., 6 days in 11 p.c., 7 days in 10 p.c., 2 days in 6 p.c., 1 day in about 4 p.c. of cases. The mean duration of the menstrual flow is 5 days in Paris, 4.6 days in London, 4.5 days in Berlin, 4.3 days in Copenhagen, 3.8 days in Austria, 3 days in Calcutta. Though the intervals between menstrual periods are almost equal in duration, the time from the commencement of one period to

the commencement of the next is 28 days in 71 p c, 30 days in 12 p c, 27 days in 15 p c. The menstrual flux varies from 3 to 8 ounces.

Heat or rut of female animals corresponds to menstruation of human females. Rut occurs in female mammals with ovarian stimulation, characterized by an increase in sexual and general nervous excitability, with congestion of the vulva and the vagina, swelling of the sebaceous glands of the external genitals, and increased secretion. From the vulvar cleft there flows a peculiar, strong smelling mucus, often tinted red from admixture with blood, there is frequent micturation, the uterine glands are swollen, the Fallopian tubes are swollen and erected. Maturation of ovum precedes the period of rut, and the rupture of the Graafian follicle occurs at the end period of the rut. Menstrual bleeding like that of human female occurs in apes. Rut occurs in animals at certain seasons of the year—spring, summer, autumn—according to the optimum food supply at its disposal. The rutting season has further several periods of heat, each lasting several days, and among domesticated animals—cows, mares, bitches succeeding one another at intervals of three or four weeks. Among animals only during the rut sexual union takes place, when alone conception is possible. In other times, the reproductive genital organs are in flaccid condition. But if the ovarian parenchyma is excited into activity, even by the injection of ordinary fluid, there is intra-ovarian pressure, and changes take place in the uterus and external genital organs as in rut.

Human beings by the regular supply of nutritious food throughout the year have liberated themselves from the limitation of seasonal ruts. But the Eskimo women in the arctic region do not menstruate during the winter. Like animals Ainus also have a definite breeding season. Though the savages during certain mystic ceremonies indulge in outbursts of sexual orgies they abstain from sexual unions for major parts of the year through religious tribus and social customs. It is the well-nourished civilized peoples with optimum food-supply at their command that have developed the greatest sexual capacity and vigor. Well-nourished city-bred nervous animated girl menstruates early. And chastity for civilized man with his strong sexual impulses is only possible when the mode of life is simple and regular, and is characterized by appropriate self command and frugality, and sexual energy is transmuted to great intellectual and spiritual strivings.

In human females about 10 days before menstruation commences, a gradually increasing hyperemia of the entire genital organs—*premenstrual congestion*—develops. The mucous membrane of the uterus swells, blood vessels become filled to bursting, and an interstitial edema occurs. Round cell infiltration occurs in the interglandular tissue, the lumina

of the uterine glands become enlarged and blood-vessels dilated. In many women a few days or a few hours before every menstruation, there is swelling of the thyroids, of the breasts, vocal cords, general excitement of the nervous system, mammary tenderness, languor, irritability and sensitiveness of the sensory system, erotic longings, feeling of warmth in the genital organs, profuse secretion of the sebaceous glands of the vulva, increased secretion of sweat, disturbance of digestion and micturation, miluse, tendency toward nausea, congestion of the pelvic organs, often local engorgement, epigastric pains, palpitation and feeling of anxiety, flushed face, blue rings round the eyes, strong impulse toward coition, increased respiratory capacity shortly before menstruation, followed by rapid decreases during the flow.

The ovarian stimulation with the ripening of the ovum gives rise to menstrual congestion and erotic longings. Hyperactivity of the ovaries stimulates thyroid. Hyperthyroidism causes general nervous excitement. Gonads, thyroids, cortex of the suprarenals and pituitary are sympathetically related. Dilatation of the pelvic blood vessels is brought about by adrenalin activity. In hyper-secretion of the adrenalin, the pelvic vessels, and particularly the ovarian artery, are subject to the same vaso-constriction which characterizes the action of adrenalin elsewhere. Pituitrin sensitizes the uterus to the action of adrenalin and causes uterine contractions by which menstrual flux is forced out of the uterus. Pituitrin also provokes nausea and acid vomiting, which also become manifest with the hypodermic injection of pituitrin. Pituitary, gonads, thyroids and adrenals are closely inter-related. Continued ovarian stimulation, nervous excitation by the thyroids, congestion and hemorrhage from the epithelium and the most superficial cell-layers which are undermined and shed of the uterine mucous membrane, and the expulsion of the muco-sanguineous fluid through the contractions of the uterine walls by the pituitrin—secretion of the pituitary gland—would continue, if it is not stopped by the corpus luteal secretion which is stimulated by ovarian activity. Corpus luteal secretion stops ovulation, brings amenorrhoea, and favours nutrition of the uterus, attachment and development of the ovum. It has been proved experimentally that if corpus luteum is destroyed by means of galvano-cautery shortly after the ovum is fertilized, the ovum fails to enter the uterus, or if the destruction is delayed until ovum has had time to enter the uterus it fails to develop, and there is atrophy of the uterus. Mammary glands are closely related to corpus luteum. Consequently there is swelling of the breast and mammary tenderness. If the ovarian stimulation is excessive, and corpus luteum does not respond quickly, then menstruation continues for a long time. If however corpus luteum activates quickly, then menstruation is only of short duration.

In about 12 days from the commencement of the menstrual flux, the maturation of the ovum is completed, and the follicle bursts and discharges the ovum, together with liquor folliculi, into the cœlomic cavity. The ovum finds its way into the fimbriated extremity of the Fallopian tube, where it is borne by its own ciliary action. The fertilization of the ovum takes place at the fusiform portion of the Fallopian tube where spermatozoa may thrive for three weeks in normal healthy condition. Fertilized ovum implants itself in the renewed epithelium of the uterus. And there is no further ovulation and menstruation, and in the absence of uterine contraction by pituitrin, the formation of a desidua in the fœtus is favoured. Corpus luteum and mammary glands continue their activities. Unfertilized ovum on the other hand is flushed out by the next succeeding menstruation which takes place in about 18 days after the bursting of the follicle, and about 2 or 3 days after its entrance into the uterus. Menstruation therefore is an aborted pregnancy to renew the soil for real and fresh pregnancy. **Membraneous Dysmenorrhea** characterized by severe cramp-like pains, resembling those of labor, followed by the expulsion of the lining membrane of the uterus is caused by the ovarian and pituitary hyperactivity. Hyperactivity of the pituitary results in violent contraction of uterus, uterine mucosa is violently torn off. Suprarenals add to the distress by the dilatation of the pelvic vessels. **Vicarious menstruation** is usually associated with infantile uterus and low calcium content of the blood. Due to the hypofunction of the pituitary gland, there is very little contraction of the uterus consequently there is little or no flux from the vulva. But ovarian stimulation causes vaso-motor congestion which is relieved by hemorrhage, at regular intervals like menstruation, through any mucous surface such as nose (epistaxis), vagina, eye, tonsils, gums, nipples, umbilicus and even through skin as *bloody sweat*.

Nocturnal Pollutions in youths, like menstruation in maidens are quite normal and a sign of excellent health if they take place twice a month or oftener with strong erections and voluptuous dreams. The frequency of nocturnal pollutions depends upon constitution, diet, mode of living, age, temperament, climate and seasons. Youngmen who suffered during childhood from nocturnal incontinence of urine suffer greatly from the obnoxious wet dreams. Youths should be taught not to be worried, rather to be refreshed, by these normal promising signs of virility. Diurnal involuntary ejaculations betray irritable weakness of the nervous system and the genital organs. Ejaculation may come out due to peripheral irritation, as for example by the friction of the clothing, repeated crossing of the legs, rough riding. Emission may be also induced by psychical irritation such as reading libidinous books, the sight of indecent pictures, erotic imaginings, or at nude females. But as long as these emissions are

flushing, excitement and stirring end in the deep breathing of the climax. Manual friction of the prepuce is common. It causes hypertrophy of the longitudinal folds. After puberty a vague impulse arises to handle the genital organs. Menstrual congestion brings a hyper-themic state of the genital organs and it results in masturbation. And gradually the habit may be vulvar, urethral, vaginal, mammary or mental. Friction of the clitoris is usual. The vulvar method is digital pressure applied to the labia minora or to the prepuce. To and fro sliding of these parts, hard pressed against the symphysis and descending ram of the pubes, or forward and backward over the edge of the subpubic arch produce nerve excitation and alternate filling and emptying of the cavernous structures of the bulbs of vestibule, clitoris and labia. Rubbing and pressing no anemas of the thighs as in the act of sewing or bicycling, bring friction of the clitoris. While sitting with crossed thighs, a slight bending forward of the trunk brings the vulva against the seat of the chair and rhythmic abductor action produces the orgasm. A cloth tied in the underwear or a roll of bed sheet held between the upper thighs or prone, beneath the vulva, the heel pressed against the vulva, vulvar contact with the corner of sitting chair or any furniture, any of these may be practised for self-gratification. Intravaginal manipulation is rare among the unmarried in the west since it is liable to lead to the rupture of the hymen, thus destroying the most apparent symbol of virginity. But in the orient where there is no such fear, or by the married, any hard or soft substance is introduced, is rubber, brimjal, banana. Psychological onanism is by erotic reverie, or by the lascivious trains of thought or recollection of previous sexual experience if any. The usual time of indulgence is at the end of menstruation or one or two days preceding the flow, particularly during the spring. The physical effects of the self abuse seem to be surprisingly small. Long indulgence may provoke vaginal catarrh and leucorrhœa. But this act of shame undermines self respect. And premature sexual stimulation may hasten closure of epiphyseal lines and thus arrest growth. In psychic eroticism the girls are often pale with a weary expression of countenance. Their eyes are dull-looking and darkly ringed. Their movements are sluggish. They love to spend a long time in beds. The physical signs of masturbation are elongation of the nymphæ, clitoris, or the preputium clitoridis, and at the same time the greatly stretched labre may be noticed and great increase of the sebaceous glands. There may be also mammary hypertrophy.

Leucorrhœa is a generic name, commonly given to any discharge from the vulva other than blood. Generally the inner surface of the vulva is simply moist during the intermenstrual time, except just before and just after menstruation when the discharge may be enough to require the wearing of absorbent pads. The normal moisture originates from four

sources in varying amounts. Secretion from the uterine cavity, secretion from the cervical canal, epithelium from the vagina, and secretions from the vulva. The secretion from the uterine cavity is a clear transparent fluid, small in amount, and having an alkaline reaction, that from the cervical canal is tenacious, transparent and thick like the white of an egg. The epithelium cast off from the vagina is mixed with the uterine secretions to form a milky fluid which is generally small in amount. The sweat and sebaceous glands of the vulva make a secretion of considerable amount, forming smegma, which is found in the folds about the nymphæ and under the prepuce. Additionally there is the glary mucus secreted by the glands of Bartholin and skin.

A white discharge occurs sometimes in poorly nourished girls, due to intestinal worms, dirt, staphylococcus which may provoke vulvitis. Masturbation may also produce catarrh. Transitory leucorrhœa in virgins may be due to pelvic congestion. The discharge is generally either white and curdy, or clear and viscid, or mixture of the two. Viscidity is due to the addition of the secretion of the glands of Bartholin, caused by sexual excitement. In married women who are accustomed to sexual intercourse, leucorrhœa may indicate pelvic congestion, either due to incomplete coitus or sexual excesses. A greenish-yellow discharge accompanied by frequent and smarting micturation betrays gonorrheal vaginitis. Gonococcus grows only in neutral or alkaline media. Therefore the normal vaginal secretion made acid by the lactic acid bacterium of Doderlein is ordinarily destructive to the gonococcus. Although the squamous epithelium of the vagina of adults, bathed in its acid secretions and protected by its normal bacterial flora, resists the invasion of the gonococcus, the tender vaginal mucosa of girls is easily penetrated by it, whence is the frequency of vulvo-vaginitis among them.

VIII—MARRIAGE

The processes of puberty in man are fully developed and completed in 25, and in woman at 22 when they reach their acme of beauty and energy. Man is dynamic and woman is magnetic. He with his ceaseless activities strives to reach his ambitious goal. In spite of his successes, he finds his goal is receding to further distance and he cannot reach it without the inspiring aid of a woman, and in spite of his numerous devoted friendships with men, he finds there is a void in him, and there is an earnest yearning in him for a close companionship with a woman, which only a trusting lovely woman can fill. Man is incomplete in himself. Man and woman supplement each other to make them whole. The union of man and woman fills out the mutual void.

Woman is delicate, sensitive, refined and receptive. Her energy is centripetal, like a magnet that attracts. But with her every movement she diffuses and radiates charms, grace and beauty, particularly after the depressing period of menstruation. Then she seems to be renewed in beauty, energy and vitality like flowering plants after a spring shower. All her sense perceptions become acute. The falling waters of a shower bath on her skin gives her a delightful sensation and thrill. The gentle southerly breezes caress her like a lover. The song of birds re-echoes her yearning soul for her fugitive companion, an unknown guest, but an intimate soul mate to feast on her youth and beauty. Her sexual characteristics have alluring manifestations—luxuriant glossy hair, lustrous open eyes, ruddy lips, full oval face, beaming with the glow of health and smiles, tall and slim figure, firm hemispherical breasts, narrow waist, broad pelvis. The very gentle touch of a male friend gives her a voluptuous thrill. She has been sexually developed, but her sexual urge is yet diffused, and not localized and canalized as in a married woman. Therefore she gets a certain vicarious sexual gratification in company of men through sense perceptions. Co-education therefore is useful. It is inspiring to men. It is stimulating and gratifying to women. It makes studies delightful. It advances progress.

During adolescence the **mons veneris** forms a rounded elevation which consists of dense connective tissue, containing large quantities of fat, while the integument that covers it is usually coated with a thick growth of hair. In most women the thick hairy covering of mons veneris is sharply limited by a curved line like the base of a triangle, while in men it is the opposite—the apex of the triangle and a strip of hair usually passes up from the mons pubis to the umbilicus. The pubic hair is seldom straight, but always curly or more or less rolled up into rings or spirals. Among the ancient Greeks, Romans and Chinese it was customary for women as a hygienic measure to remove the pubic hair to prevent the formation of the nests of parasites (*Pubes ascaris*) and the decomposition of urine and menstrual blood. The physiological function of the pubic hair was to protect the genital region from thorns, insect bites, irritation from sweats and to protect the skin from direct friction during copulative movements. Possibly in primitive times young children adhered themselves to their nude parents by the pubic hair.

The labia majora are well-developed and their outer surface is hairy. The inner surface, though of mucous membrane, fine hairs are also found. In parous women there are small or large lacerations of the frenulum pudendi or fourchette in front of the posterior commissure of the vulva. In multipare, and even in women who have frequently had sexual intercourse, these inner surfaces of labia majora are not usually

any longer in mutual contact, so that the *rima urogenitalis* or vulval cleft appears more or less. In healthy adolescent maidens the dense fatty connective tissue of the *labia majora* gives these structures a certain firmness and elasticity, and *labia minora* (*nymphæ*) do not project beyond them. The *nymphæ* are of soft delicate consistency, and their mucous membrane is of pink color. The clitoris of hyper-ovarian woman, having frequent sexual intercourse or manipulation, is largely developed, and sometimes the dorsum of the organ protrudes from between the anterior extremities of the *labia majora*. Vagina is like a flexible tube if shortened to nearly half its length by a cord passed from end to end through one of its sides. The ridge thus formed is called the anterior column of the vagina, and marks the visco vaginal septum, it is about two inches long. While the posterior wall or posterior column is twice that length. The anterior column or cord causes the investing mucous membrane to be puckered and thrown into folds or rugæ which run transversely toward the posterior column. The mucous membrane is studded with papillæ which are covered with pavement epithelium. The papillæ which are threadlike and filiform transmit voluptuous sensation. The vagina is separated from the vestibule and the vulva by the *hymen* or its remains—the *carunculæ myrtiformes*. The latter are surrounded by *labia minora*. At the anterior junction of the *labia* lies the clitoris, and about 2 cm beneath it is the *os externum urethræ*. Externally to the *labia minora* are the *labia majora* which unite posteriorly in the *trunculus labiorum pudendi* or *tourchette*, and are continuous anteriorly with the *mons veneris*. The surface of anterior and posterior vaginal wall is rendered uneven and rugose by well-developed vaginal columns (*columnæ rugarum*) which feel almost as hard cartilage, and project considerably above the general level of the wall. The transverse ridges (*rugæ*) run horizontally outward from the columns. By frequent copulation the rugæ are partially effaced, and the columns themselves become flatter and softer. Still except in cases in which the genital functions are exercised to great excess, the vagina remains tense and rugose until after several children have been born, when it becomes soft, flaccid and smooth. Even in women who have been accustomed to frequent intercourse, the narrowest portion of the vagina is still the orifice which can be constricted by the levator ani muscle, childbirth however brings about great and permanent distension of these parts also.

The **fallopian tube** is divided into three parts—the *pars interstitialis*, continued within the uterine wall, the *pars isthmica* reaching from its junction with the uterus, *pars ampullaris*. The **ovary** is a flat almond-shaped body, connected to the uterus with its uterine pole. The ovaries undergo changes in size, shape and consistency, depending upon the age, endocrine functioning and sexual activity. The ovary is covered

by a single layer of the germinal epithelium. Beneath this is a thin layer of connective tissue, the tunica albuginea ovarii, which is intimately connected with the underlying stroma. The latter is made up of connective tissue, having small spindle shaped cells, embedded in which are about 60,000 Graafian follicles. The **uterus** is about the size and form of a middle sized pear. It is 5 to 8 cm long in nulliparous, and about 6 to 9 cm in the multiparous. The uterus is divided into three parts: the **cervix**, projecting into the vaginal vault, about 2.5 to 3 cm long; **corpus**, limited by the wedge shaped and upward spreading cornu of the uterus; the corpus is 4 to 4.5 cm long; the **fundus** is the part lying between the upper corners of the cornu. The anterior wall of the corpus is almost flat, while the posterior wall is convex backward. The thickness of the walls of the uterus is about 1 cm in the cervical portion, and 1 to 1.5 cm in the Corpus and Fundus. They consist of irregular bundles of smooth musculature interwoven with each other, enclosing connective tissue, vessels and nerves. The uterus is bent at an obtuse angle over the anterior surface.

The glands of the **cervix uteri** provides a secretion that increases the mobility of the spermatozoa and which facilitates their passage into the uterus. In nulliparous married woman, the uterus differs little from that of virgin; the cavity is somewhat more extensive, the convexity of the outer surface a little greater, there is some increase in width in the neighborhood of the fundus. Further under the influence of copulation the appearance of the vagina changes: it becomes larger, and its walls become smoother, sometimes quite smooth, from the disappearance of the ridge of the mucous membrane and especially of those attached to the posterior vaginal column. The vaginal portion of the cervix is, as in a virgin, of a rather tough consistency, smooth on the surface, while the external os is small like a dimple, or transversely oval; the color of the vaginal portion of the cervix is identical with that of the vaginal mucous membrane in general. Through frequent copulation, the form of the vaginal portion of the cervix is so far altered in as much as it is more freely supplied with blood, and therefore, changes slightly in consistency. In multipare, in consequence of the lacerations of the cervix, the os uteri externum gapes and changes to a wide transverse fissure with tumid margins, usually, beset with scarred depressions, justifying the old designation *os tinctæ*—carp's mouth. The vaginal portion of the cervix is shortened. A large size of the external and internal os, moderate enlargement of the cavity, rounding of the upper angles adjacent to the uterine orifices of the Fallopian tubes, increased convexity of the walls and partial effacement of the plicæ palmatæ are the characteristics of the uterus of the multipare. The vaginal portion of the cervix is longest in women who have undergone defloration.

and in nullipara narrowest in childless wives, thickest in young widows; & cost in prostitutes.

The biotic impulse through the sexual and accessory glandular oratory excitations, males and females are drawn to each other for reproduction. Men feel it strongly when there is erection due to the pressure of spermic accumulation or due to its nervous excitement. Women have a powerful sexual inclination during their ovulation—at the ripening of the ovules which provokes menstruation and at the bursting of the Graafian follicles which takes place 12 days later. The sexual passion reaches its highest wave crest in both hypergonadic men and women at the age of thirty when one feels it is almost overpowering and irresistible. Hypersecretion of the gonadic glands provokes tumescence of the generative glands and erotogenic centres. Accessory sympathy to the thyroid hypersecretion develops general nervous excitement and it is on that provoking insomnia and erotic dreams. Overstimulated pituitary pour forth adrenalin into the blood stream raising blood pressure, provoking headache and pelvic congestion. Pituitary glands secrete ptyalin which provokes hyperacidic emesis thus provoking gastric and digestive disturbance. Naturally therefore with sexual orgasm, relief of these disturbing physiological tensions corresponds with gratification, exhilaration of body and mind and sweet restoring relaxation. With exercise of every muscle, nerve or organ, there is pleasure and animation. With the frictional exercise of such nerve-studded mucosa of the sexual organs, naturally there is an ecstatic joy. Even to nature, no doubt, genital tumescence is relieved to a certain extent by detumescence in men through periodic nocturnal emissions and in women through menstrual discharges. But they are involuntary. The whole body and the mind—all the senses—do not partake in the relief. And menstruation may be painful so there is no animation. Rather there is depression—a feeling of remorse that all these ills are due to lack of natural sexual gratification. Continents, though deprived of much joy in life for lack of sensory stimulants and delights, actually suffer little ill health. But lacking exercise and stimulation their sexual glands atrophy early and consequently they age prematurely. Many monks and nuns enjoy healthy long lives. Stallions and mares, dogs and litches remain healthy even when they are not allowed to copulate. Seminal fluid is not an injurious metabolic waste end-product like urine which needs to be evacuated and whose retention is deleterious to health. Rather it is a valuable tonic oxidise. It arrests regressive metamorphosis of nervous ganglia. The **Semen** as ejaculated is a white or whitish yellow viscous, sticky fluid of a milky appearance with whitish, non-transparent lumps. The milky appearance is due to millions of spermatozoa. The semen in vas deferens differs chiefly from the ejected

semen in that it is without peculiar odor which depends on the admixture with the secretion from prostate. It is alkaline in reaction. Soon after ejaculation semen becomes gelatinous, as if it were co-agulated, but afterwards becomes more fluid. Semen contains 96.8 p. m. solids with 9 p. m. inorganic and 87.8 p. m. organic substance. The protein substance, on an average 22.6 p. m. consists chiefly of nucleo-proteins, beside a substance similar to *fibrinogen* and to *mucin*. The mineral substances consist chiefly of calcium phosphate and sodium chloride. Besides this it contains an enzyme *vesiculase*, *leathin*, *cholin* and *spermin*, a crystalline combination of phosphoric acid with a base. It is through the absorption of semen from vaginal-uterine walls many anemic women improve their health after marriage. Austrians give orally a potion of fresh semen to their exhausted and dying men for revival. Part of the semen is reabsorbed in the vesiculæ seminales during sexual continence, and this reabsorption exerts a beneficial effect on the constitution of athletes, scholars, warriors, artists and mystics who feel most fit for work when they refrain from sexual intercourse. Reabsorption of semen promotes nutrition and bodily strength, and it favours particularly the activity of the nervous and muscular systems. This is evidenced by increased muscular activity, a diminished sense of fatigue, and enhanced recuperativeness. It is possible that reabsorption does not keep space with the secretion so that the injurious congestions of the latter take place in the seminal glands and ducts. Some absorption and accumulation in hypo-gonadics have certainly a tonic effect. But in hyper-gonadics excessive loading and absorption provoke nervous and local irritation, which nocturnal emissions are not sufficient to remove, but need unloading by periodical sexual acts. Otherwise there is nervous irritability, insomnia and headache. But the effects of nervous irritation of re-loading are to be temporary only. For like all other organs testicular activity is increased by use and diminished by non-use. But many old maids and married women who do not get sexual orgasm due to short and incomplete copulative acts of their husbands, suffer from leucorrhœa and uterine fibroid growths between the age of 30-40 due to chronic pelvic congestion and irritation. Cysto-adenomata of the ovaries are also frequent. However nature gives as an alluring bait individual pleasure for the propagation of the race, as the bright colors, nectar and aroma of flowers are made to attract insects to bring pollens into pistils for fertilization. It is but an illusive trap.

Marriage is more than a temptation and a license for sexual gratifications. It has serious physical, psychic, social, hereditary and pathological consequences. The object of marriage is generally the gratification of sexual impulses without dangers to venereal infection, injury to limbs and social complications, which is rendered

possible by conjugal cohabitation and fidelity. The procreation of offspring, often as a chance by-product of personal sexual gratifications, but occasionally also a welcome guest, forms a trinity with parents, to bind them together, and the family, the state and their continuity. An increase in the reciprocal happiness is found through physical and psychic comradeship, sharing their joys, sorrows, usefulness and economic interests together for themselves and for their children. But for sensual gratification there must be proper physical adjustments, or pleasure may be undermined, laying the foundation of physical and mental miseries. If there is disproportion between the size of the penis and the caliber of the vagina, and if Bartholin's glands do not lubricate the passage by its secretion, due to lack of sufficient stimulation instead of strong resilient, accomodating and grasping vagina, the erect penis passes the vaginal dry walls, affording no voluptuous thrills to any, rather giving pain (dyspareunia). Anatomical causes of both difficult and painful intercourse (dyspareunia) are many, a rigid hymen, a small vagina, either from faulty growth or from cicatrical stenosis, vulvatis, chronic vaginitis, vaginismus, and inflammation of the ovaries and uterus. Adhesion between the labia majora and labia minora is sometime met with a congenital deformity which may or may not be associated with atresia of urethral orifice. Elephantiasis or lipoma of the labia majora may make the intromission of the penis difficult, if not impossible. Among the Hottentot (Hottentot apron) and Abyssinian women hypertrophy of the nymphæ is not uncommon. Fibroid growths in the vagina is occasionally met with, interfering with copulative acts. Hypertrophy of clitoris is found among the Negroes, Abyssinians and masturbators. Penis is also found very much enlarged through habitual hyperæmia, caused by masturbation or frequent performance of sexual act, and it is especially observed during erection when the blood spaces through corpora cavernosa are greatly distended. A strong man with a ponderous weight would heavily press his delicate wife and cause her serious heart troubles if he does not balance his weight on his elbow or change the normal copulative position. Disproportionate age brings also physical and mental disharmony. Lycurgus forbade Dorians to marry before attaining the age of 37. Plato demanded for men the marriageable age of 30 and for women 20. According Hesiod (Works and Days 720) man should not be less than thirty, woman 25 or 24. Aristotle advised that men should not be allowed to marry before the age of 37 and woman before the age of 18, women should give birth to a limited number of children only, if after this they again became pregnant abortion should be induced. Aristotle maintained that if all were at liberty as was the case in most countries, to bring into the world as many children as they pleased, poverty, the mother of crime and

insurrection, must inevitably ensue. Plato maintained that before every marriage man and woman should both undergo official examination to determine their fitness or unfitness for the marriage, both being made nude. Plato regarded marriage as a form of suicide if the man was incapable of satisfying and fertilizing her. Plato in his *Republic* asserts that it is the duty of the government to regulate the number of citizens and to prevent an immoderate increase, men and women should be allowed to procreate only during their period of maximum strength and all weakly children should be killed.

Physical Examination is not only necessary to prevent the introduction of venereal diseases through coitus, thus wrecking the conjugal happiness, but also making the conjugal partner a life-long invalid, and also to see that there is likelihood of proper physical adjustment and mutual gratifications. And when due to either weak erection, coitus interruptus or ejaculatio præcox, rendering the stimulation insufficient, sexual gratification and orgasm are not experienced, there are cardiac reflex manifestations, and congestion of the reproductive organs leads gradually into chronic hyperæmia, metritis and perimetritis. It disturbs sleep, induces insomnia, leading gradually into neurasthenia. Every act of sexual intercourse in a young and sensitive woman exercises an exciting influence on the nervous mechanism, controlling the cardiac movements, proportional to the intensity of sexual excitement. The heart's action is markedly increased in frequency, the cardiac impulse is more powerful, the large arteries of the neck pulsate far more vigorously, the conjunctive is markedly injected, the respiration is increased in frequency, the respiratory movements are superficial and have a panting character. When the intercourse is broken off either by premature ejaculation or coitus interruptus, the woman is left in the *mid air*. There is no natural relaxation. She loses her sleep and her nerve with a palpitating heart.

According to *Manu* a youth of 30 (*Manu* IX 94) should select a maiden (according to *Susruta* not less than 16) of equal status and complexion (*Savarnā*) with all the pronounced feminine attributes (*Sulakṣmā*), belonging to a family, however rich or influential it may be, which is not criminal, where only daughters are born, uncultivated, or suffers from hirsuties, hemorrhoids, tuberculosis, dyspepsia, epilepsy, leucoderma and (syphilitic) ulcers, or a girl who is suffering from jaundice, supernumerary fingers or toes, glycosuria, whose hairy growth is deficient, opacity of the cornea, cataract of the eye, sickly or consanguineous (*Manu* III 4-11). *Bṛhat Samhitā* describes *Sulakṣmā* feminine attributes as round large hip (*jaṅghā*), round thigh (*urū*), buttock (*nitamba*) fleshy and large, breasts (*sthana*) round and firm, lips (*adhhara*) curved and ruddy with beautiful regular pearl-like

teeth, oval face with ruddy flesh, distended nostrils, lustrous open eyes, long eye-brows, broad pelvis (prokosta), fine and glossy hair on the head, pelvis and armpits. But a girl is hardly fit for motherhood before the age of 24. In early adolescence there is a great physical strain due to growth, and mental ill-at-ease due to difficulty of environmental and social adjustments, arising out of conflict between ideals and realities of life. If therefore a further demand is made upon the vital energy for motherhood, a delicate girl-mother may become an easy victim of tuberculosis of lungs. Mortality of young mothers is very high in India.

Hereditary transmission of certain malformations is well-known such as supernumerary fingers or toes, harelip, cleft palate, non-development of female breast, dwarf, giants, myopia, colour-blindness, hemeralopia, hereditary cataract, atrophy of the retina, retinitis pigmentosa, warts, birth-marks (naevi), neuromata, neuro-fibromata, deaf-mutism, haemophilia. Hereditary predisposition from generation to generation is noticed in certain metabolic disorders as gout, jaundice, renal calculus, diabetes, cystinuria. Many chronic and exhaustive diseases such as syphilis, tuberculosis, alcoholism, mental and nervous diseases are productive in the descendants of feeble vitality, diminished resistibility, slow and incomplete development. Mental and nervous irritability often cling tenaciously to some families for generations. Hereditary syphilis is transmissible up to third generations. The children may be directly infected by one of the two parents who has acquired the disease in the course of the married life or syphilis may be transmitted by the act of generation or through placental transmission during pregnancy, if the mother is infected. The more recent is the infection, greater is the virulence of the hereditary manifestations. Children of syphilitic parentage are predisposed to tuberculosis. In consanguineous unions all the good and bad predispositions are aggravated and accentuated. Possibly constant association from childhood blunts sexual enthusiasm. There may be affection. But sexual stimulus is enhanced by novelty, variety and contrasts. Its deprivation is one of the causes of greater sterility in inbreeding.

In the case of gonorrhea of the male marriage may be permissible when there are no shreds in the urine, when the gleet discharge from the urethra has ceased and when repeated examinations after provocative vaccines show no gonococci of the mucus from the meatus. It should be remembered that gonococci autolyse and disappear in alkaline urine. Therefore the urine should be centrifugalized without delay. The blood may be tested with a gonococcus antigen for complement fixation.

In women gonorrhea usually runs a very mild course, so mild that many women are ignorant that they suffer from this disease though

the frequency of *ophthylta monatorum* reveals its wide-spread affections. Infection of Bartholin's glands, follicles around the urethra and uterine cervix contributes to the chronicity and continued infectivity, especially about the menstrual period when there is congestion of the genital organs, and consequent liberation of more abundant flora of gonococci, due to the diminished acidity of the vaginal secretion which is ordinarily destructive to gonococcus.

Acute and chronic endometritis, salpingitis, oovitis and pelvic cellulitis due to the infection of gonococcus are apt to follow the birth of the first child. So gonorrhea is one of the primary causes of complete, or one child sterility. When the gonorrhoeic process attacks the mucous membrane of the uterus, there ensues more or less suppurative endometritis, accompanied as a rule by distressing subjective symptoms. Apart from the severely felt disturbances of menstruation, it constitutes a frequent cause of sterility, either because the implantation of the impregnated ovum is prevented, or a premature expulsion of the implanted embryo takes place subsequently. Notwithstanding a complete retention of their function by the semen-producing testicles, *gonorrhoeal* inflammation causes in the semen-conducting parts—epididymis and spermatic cord—gonococci proceeding from the urethra lead in a large number of cases to mechanical obstruction in the flow of spermatozoa with the urethra, either through cicatricial compression of the ducts or through a purulent dissolution and destruction of the whole epididymis, with or without external suppuration. The man becomes frequently sterile if his semen conducting passages on both sides are gonorrhoeally diseased, in spite of complete retention of erection and the preservation of an abundant ejaculatory fluid from vesiculæ seminales and the prostate. Gonorrhoeal stricture may lead to cicatricial closures and distortions of the openings or channels of the ejaculatory ducts to such an extent that there is either no discharge of semen at all into the urethra, or that the ejaculation takes place in a posterior, instead of an anterior, direction. Narrow strictures of the urethra can result in making the ejaculation difficult or depriving it of its shooting jets, so that it is replaced by slow dripping after the cessation of erection. In this way very little semen can reach portio vaginalis, so hardly there is any chance of spermatozoon fertilizing ovum. Such strictures allow no doubt the passage of urine. But semen is much thicker and more viscous than urine. And during erection, strictures become narrower, and semen should be swiftly pumped out in shooting jets to be able to fertilize the ovum. But azoospermia and oligospermia do not necessarily interfere with copulative performances.

Syphilis brings immense sufferings to its victims, undermines the family and degenerates the race. Being communicated through

germplasm either it kills the offspring by abortions or blights their normal development. The object of marriage is not only personal sexual gratification, but to build a happy home with a contented wife as a partner, and also to have a number of healthy well-developed intelligent children. Syphilis if not radically cured in the first stage is bound to wreck personal health and joy, infect the wife and produce a number of sickly, physically, and mentally deformed children. Contagiousness and susceptibility of hereditary transmission make syphilis an important factor in relation to marriage. But in large number of cases its contagiousness and hereditary transmissibility are not manifest after the fourth year. But in cases which have not been thoroughly cured between 10-20 years there may be tertiary manifestation of the disease—tabes, general paralysis, and other lesions of the nervous system—which are generally invalidating and incurable, thus incapacitating him to guide, earn and support the family.

Syphilis may be conveyed by either direct or mediate contagion. While syphilis is usually acquired through the direct inoculative contact of the genital parts in sexual intercourse, it may also be inoculated in the act of kissing from a mucous patch in the mouth. Any object upon which syphilitic virus—*Spirochæta pallida*—has been deposited as spoons, cups, glasses, towels, telephone, razor may spread the disease. In vaccinating a number of persons, if one of them is syphilitic, the point of the lancet may be charged with his blood, and the next one vaccinated may be innocently infected with it. The physiological secretions such as milk, urine, semen or glandular affluva are contagious. Outside the body however *Spirochæta pallida* is a relatively non-resistant organism, being rapidly killed by drying, weak antiseptics, soap solution and a temperature over 55°C (130°F). Towels contaminated with it and kept moist still contain *Spirochætes* after exposure to diffuse daylight for 11½ hours. Blood containing the *Spirochætes* will remain infective for several days outside the body.

After inoculation with syphilitic virus, there is an incubation period of between 3—4 weeks, on the average 25 days, which is followed by the appearance of *primary sore* or *hard chancre* at the site of infection. Sore turns into an ulcer which heals. The interval between the appearance of chancre and syphilitic eruptions on the body is called the period of secondary incubation, which averages from 6—8 weeks during which there is an enlargement of the nearest lymph glands. Then there is febrile re-action, accompanied by headache, pains in the back and limbs, sometimes so slight as to escape observation. Fever subsides with the appearance of eruption. The eruptions vary in form, extent and severity. Thereafter even in untreated cases, as a rule, the organism diminishes in number, and lesion disappears. This is due to an immunity reaction on the part of the tissues of the hosts. The existence of such acquired

immunity is shown by the fact that the individual has now become insusceptible to fresh inoculations. The cessation of eruption may be permanent making a definite end of the disease, or it may be only a latent stage during which the patient seems to be in good health. Apart from the presence of general adenopathy and in the absence of clinical history symptomatic diagnosis may be impossible at the time. But the patient continues to be infectious and is liable to relapse. This latent stage extends over 5—10 years after infection. But in latent stage they are still infectious. The tertiary stage, after a latent period from 5 to 20 years is characterized by lesions of the deeper structures—the subcutaneous tissues, muscles bones, internal organs, central nervous system. When central nervous system is involved *general paralysis of the insane* (dementia paralytica) and locomotor ataxia (tabes dorsalis) are manifested, known as *parasyphilitic* conditions. Two years thorough treatment in the beginning is necessary, before marriage should be permitted.

Hereditary Syphilis—A syphilitic man may beget a syphilitic child, through infected spermatozoon, the mother remaining uninfected. The paternal influence is of short duration, being rarely manifest after the third or fourth year. As regards its effect on the fetus, the mortality of the offspring is about 25 p c, and morbidity 38 p c. Healthy children may be born of the father after his radical cure. The woman who has given birth to syphilitic children by a syphilitic father may have healthy children by a non-syphilitic person. A woman who has given birth to a syphilitic child may acquire the disease through utero-placental circulation. A syphilitic woman may bring forth a syphilitic child, the father being uninfected. The transmissive power of the mother is much more active and pronounced than that of father, and more prolonged in duration, 5 to 6 years or longer. The mortality of the offspring is 69 p c and morbidity as 84 p c. When both parents are syphilitic at the time of fecundation, the transmissive power of syphilis acquires its maximum of intensity, causing a mortality of 72 p c and morbidity of 92 p c. But a healthy mother may be also infected by the syphilized fetus, procreated by a syphilitic father who however at the time of copulation is free from any cutaneous or mucous membrane manifestations of the disease and thus incapable of directly infecting his wife. The age of syphilis, treatment, diet and mode of living modify the hereditary influence of the parents. Time exerts a marked attenuating influence upon the diathesis, there being a progressive enfeeblement of parental infection, as evidenced by a series of successful pregnancies. Abortions may take place at a more and more advanced period of fetal development, until they cease, and a pregnancy results in a child living, but syphilitic; but still later children have no stigma of syphilis. Specific antisypilitic treatment suppresses temporarily the transmissibility of the disease.

A mother may have one or more abortions from syphilis, and then if she be subjected to active treatment, and if pregnancy occurs she may bring forth a healthy child. But if the treatment is discontinued, pregnancy may result in a syphilitic child.

Congenital syphilitic infants are a source of infection, since the secretion and skin lesions harbour *Spirochaetes pallida*. But later on, in an acquired disease, the organism becomes so scanty that these cases are for practical purposes non-infective. There is no proof that a congenital syphilitic male can transmit the disease by sexual intercourse or congenital syphilitic female can produce a syphilitic progeny. Recent syphilis of the parents usually leads to death of the fetus in utero. Earliest conceptions generally result in abortions about the third to fourth months. Later on the embryo progresses to a later stage. Gradual attenuation of virulence is manifest in successive pregnancies. Congenital syphilis differs from the acquired type that there is no primary sore. The infection occurs through placenta and inseminated through the blood stream. In syphilitic fetuses, *Spirochaetes pallida* are found in enormous numbers in the liver and suprarenals and on mucous surfaces. In the liver the overgrowth occurs in the neighborhood of the capillaries, hence periportal cirrhosis results. The organ is enlarged and firm, the surface smooth and on section it appears glassy. Syphilized infants are often plump and healthy-looking at birth and appear healthy until lesions appear with fever and bulbous eruption which affects especially the palms and soles (*syphilitic pemphigus*). At margins where skin and mucous membranes meet such as the lips and anus, ulcerative fissures or rhagades sometimes form, leaving scars which radiate outwards from the orifice. A chronic nasal catarrh becomes evident from the earliest stages, being sometimes present at birth in the form of *snuffles*. The discharge, mucous or purulent like other lesions of infants suffering from congenital syphilis, contains *Spironema pallidum*. The *testes* may present hard swelling, which is not likely to have any other cause at this age. Thickening of the frontal and parietal bones around the anterior fontanelle (*Parrot's nodes*) develops from the sixth to twelfth months. Necrosis of the nasal bones leads to *saddle nose*. The *spleen* is usually moderately enlarged. The *liver* is commonly found diseased in those cases which die *in utero*. Infants who are born alive there may be diffuse interstitial hepatitis or diffuse gamma. In the former case the liver is moderately enlarged, smooth and a little firmer than usual. There may be jaundice, or more rarely ascites. Gummata are usually multiple. They are generally recognised in early infancy, but in later childhood, from the age of six years, may be felt as multiple bosses on the surface of the liver. The milk teeth of syphilitic children are apt to be malformed, chalky and lost early. The cutting edge of the

upper central incisors is converted into a crescentic notch (Hutchinson's teeth) Dome-shaped first permanent molars (moon's teeth) are also noteworthy Deafness of the internal ear is a less common affection It comes on gradually at or about puberty *Juvenile General Paralysis* occurs from childhood to early adult age The mental symptoms are chiefly those of dementia which sets in more or less rapidly *Interstitial keratitis* of the eyes occurs usually between the age of 5—15 years The disease usually affects one eye, the other being involved later There are cloudy patches in the cornea with ciliary congestion, pain, lachrymation and photophobia Finally the patches coalesce and the whole cornea looks like ground glass *Iritis* and *choroiditis* may be more marked than corneal opacity and occur in the first three to four months or later The Wasserman reaction is of great value, but it should be remembered that it tends to die out after puberty Inherited syphilitics are characterized by slowness and retardation of development, the growth being stunted and dwarfed Such children grow slowly All their developmental processes are slow and retarded They develop their teeth slowly Their genital organs are often rudimentary and undeveloped Their intellectual developments are also likewise slow from congenital nervous asthenia

Marriage therefore to be successful requires not only physical adjustments, good health, but must be based on eugenic principles. Hindu law-givers emphasized on eugenic importance For children are more a family, social and state concern than simply parental responsibility. Mental adjustments have become no less important If ideals and outlook of life differ, and temperaments do not agree, it is difficult, instead of best efforts, to build a happy home In primitive society and in ancient times wife is selected simply to cater to the comforts of man She has no independent will of her own She subordinates it to that of her master Marriage is a kind of profession in which she barter her body and soul in exchange of food, clothing and conjugal life No doubt with the evolution of modern civilization and monogamous institution, woman has improved her status as the builder of home comforts and the radiating centre of domestic felicity It has developed in her conjugal fidelity, patience, sympathy, maternity and filial love It is but a gilded cage Fundamentally it is no better than prostitution though there is a world of difference between the two in their social significance A wife surrenders herself permanently in exchange of using her husband's name and family connection, without any reservation whether husband infects her with venereal diseases, disturbs her sleep, provokes in her pelvic pains and nervous disturbance through premature ejaculations, saps her vitality through quickly repeated successive pregnancies, causes abortion by brutal coitus in her advanced state of

pregnancy or damages severely the generative organs in early puerperium before reproductive organs have involuted to normal healthy condition And child births results in huge maternal mortality Prostitute in that sense is better off She sells her body but temporarily with the reservation of all her personal rights She can change her lover without any ceremony if she begin to dislike him Though law grants divorce in majority of civilized countries for infidelity and cruelty, it is very hard to procure And for an elderly woman with a number of children, it is hardly any remedy It is hard for her to remarry And marriage is a kind of gambling, jumping into the uncertain And in her husband's house her service as a house-wife is rarely appreciated as an economic value And many women have not received any training for economic independence Economic interpretation of marriage is rarely emphasized Marriage remains today the worst kind of human slavery, dealing with living human flesh, though sanctified by religion and the state

Though many sensitive and refined women are finding marriage very oppressive, men are finding it no less irksome Marriage is losing its glamour of romance In the tense struggle of severe economic competition, men are finding it hard to maintain in luxurious comforts a parasitic butterfly flirt without supplementary income from her efforts Though before marriage, she may be charming, radiating smiles and joys, after marriage she is an irate, nervous, sickly being Though she allows the performance of sexual intercourse to accomodate her eager husband, she does it as a wifely duty, at the sacrifice of her sleep and nervous tranquility, and rarely finding any gratification in it She is abruptly sexually approached at a time when she may be at her low ebb tide of her ovulation without any preliminary caresses of her erotogenic centres And when she is roused by copulative frictional movements, he is a quit, slumbering like a child by her side, being relieved by detumescence, while she with her ungratified pelvic congestion and nervous excitements, knowing no repose and sleep, reflects on the hollowness of conjugal sweetness No wonder with her jerked nerves, she cannot smilingly greet her husband in the morning The husband finds his wife cold Copulative pleasures are only ecstatic with an ardent excited woman Husband does not know the arts of rousing his wife, and the unexcited wife, knowing not the technique how to be excited or to simulate it, cannot give thrilling response The prostitute knows how to be gay, how to give different pleasurable stimuli during sexual intercourse, how to prolong it and to bring the climax with voluptuous thrills That is her professional technique of enchantment which attracts many married men who support the profession more than the unmarried and confirmed bachelors The wife feels it indecent and beneath her dignity to learn amorous rhythmic movements

which add immeasurably copulative pleasures. The husband finds it hard to abstain from sexual intercourse, once being accustomed to it, during advanced pregnancy and puerperium which last for months. And the wife finds it hard to accommodate her fervid husband without seriously risking her health. If he goes to a prostitute, she may be infected by venereal diseases. *Demosthenes*, the great Athenian orator, said "We marry a wife in order to obtain legitimate offspring and to provide a faithful guardian of our household, for our service and for the performance of daily household duties we keep concubines. for the joys of love we seek the hetiræ." This is no longer possible without taking the risk of venereal infections, and infringement of laws. Marriage therefore is proving disenchanting and disillusioning to a growing large number of men and women.

Women have obtained votes in many states. In many countries they earn their living in competition with men as teachers, stenographers, secretaries, nurses, physicians and lawyers. Now hardly any educational avenue is closed to them. They study with men in schools, colleges and universities on equal terms. They are comrades in studies sports and business. Marriage is no longer the only profession left to them to earn an honest honorable living by the permanent and inalienable transference of the rights over her body. They are demanding therefore equal rights with men in the rights of livelihood and love. Economic independence will secure for them independence in other spheres of life. Though monogamy has proved its superiority to polyandry and polygamy in social stability and progress, increasing number of divorces and more numerous domestic frictions are betraying its inherent weakness and undermining the matrimonial structure. Woman in modern times can no longer be regarded as a personal property. Permanent contact of bodily service and mental devotion without any reservation is a psychological absurdity. Body and mind are constantly changing, and with the changes new adjustments are necessary. Some advocate temporary companionate marriage for six months, which, if successful, is to be declared to be permanent or to be annulled. But here the same difficulty rises as in permanent unions. Six months are not a sufficient time to test physical and mental adjustments and harmony. Others advocate that men and women should live, earn and love independently without any mutual dependence and bondage. Women should be given by the state a motherhood leave of absence and allowance for six months. After that children should be handed over the state nurseries as in ancient Sparta. However if any mother wanted to keep her child with her, she might be permitted to do so. This will make the sex selection operative all the time for all reproductive adult men and women. Men would try to captivate women by their intelligence,

wits, health, vigor and virility. Women will attract men by their refinement, charms, grace and manners. The children of these love unions—and all the unions will be love unions of mutual selection, as men and women would earn their independent living and would not be dependent on any—will be lively, energetic, vigorous and intelligent. But the free love will prove disastrous to civilized peoples if venereal diseases are not conquered in the meantime. Venereal diseases will spread virulently and widely in spite of any strict medical supervision or certification. Marriage has been a safe asylum for woman as long as she is weak, a comfortable home of provision for her and her children and a pleasant refuge for her in her old age. It has indirectly protected her from the ravages of venereal diseases. Marriage is the impregnable fortress against venereal infection. Wherever free love has been tried it has gradually led to prostitution, and consequent sterility—a kind of racial suicide. No doubt venereal diseases will be conquered by vaccines like small pox, or they will be quickly and radically cured. Yet till that time marriage is the best protection of woman, in spite of many inconveniences, and she instinctively feels it. But no marriage should be permitted without the medical certificates of good health from state authorities.

glans and penis Thus a reciprocal friction of these two *tense sensitive* voluptuous organs takes place repeatedly by each copulatory movement made by the two parties in the act Rhythm and movement of the hips enhance immeasurably copulative pleasures so that with each movement the degree of contact and pressure is always changing, thus adding new voluptuous stimuli Wife must know that movements of her hips, consequently of vagina, add not only to her husband's voluptuous stimuli, but also add to her pleasure and hasten her orgasm Her rubber like accommodating passivity cools her husband's ardour and makes her not only frigid but also undesirable to him Life is rhythm and movement The cessation of movement by either party robs the ecstasy of the sexual congress and kills its thrilling ardour The copulatory movement, swayed by the sexual excitement, spreads over the entire sympathetic vasomotor system, and causes its paralysis It results in the widening of the coronary arteries, hyperemia of the cardiac muscles, and hence an excitation of their ganglions and consequent palpitation of the heart The circulation is accelerated, the arteries beat strongly, and the venous blood, arrested in the vessels, augments the bodily heat Respiration is rapid, and panting breath comes in short and quick intervals, the air being expelled with spasms The eyes are injected, the bulbs of the eyes protruberate There is a tendency to perspiration, salivation and urination The pupils are enlarged and they are spasmodically closed to shut out light The nostrils are dilated As the orgasm approaches, the uterus undergoes erection, its base touches the anterior abdominal walls, through which the Fallopian tubes can distinctly be felt as thin curved strings The vagina, especially its upper part, undergoes rhythmic contraction and dilation The spincter cunni, the muscle guarding the vaginal orifice, contracts, and tightly grasping and clinching the root of the penis, stiffens its erection until ejaculation takes place like the forcible jets of a syringe During the orgasm the uterus descends deeper into the small pelvis, pushed by the pressure of the abdominal muscles The uterus usually flattened in the sagittal direction assumes a round pear-shaped form which outlasts orgasm for sometime. The circular fibres of the cervix contract at the same time as the longitudinal fibres This results in the dilation of the cervical orifice The contraction of the cervical fibres causes the erection of the vaginal portion and of the neck of the uterus This erection at the moment of orgasm serves to expel Kristeller's slimy plug—the orgasmic thick mucus—from the cervix of the uterus After this ejaculation the cervix becomes soft and flabby The erection and the sudden relaxation cause the external os to open, sometimes to the extent of fully three centimeters, and to make several successive gasps The muscular fibres situated within the tunica media of the vaginal mucous membrane contract, starting from vaginal vestibule

entire circulation of the semen, thus forcing it under a certain pressure into the uterine cervix. The uterine orifices of the tubes which are usually closed open widely and through the vacuum created by the contraction of the circular and longitudinal fibres at the same time the cervix exerts a convulsive grip and each grip drawing powerfully the contents into the cervix causes the sucking aspiration of the semen by the hypovovarian woman especially during the flood tide of her sexual excitement or on a very quick, very gratifying, and reflex action complete. But in hypovovarian woman especially during the flood tide of her ovulatory phases or middle aged, it is very slow and retarded. When for a youth with a vigorous erection of penis is not sufficient to induce a desire and or sexual joy. But with a weak erection or a very excessive erection it comes very quickly. In Hindi literature

wherein bride is being copulated by the Heavenly Father copulating with the Earth Mother and is unman and fecundating her with the seed of rain both women come to the earth and becomes pretty with the seed and become fruitful. After a hot and draughty season the parched earth sucks the rain drops and the plant become pretty with the seed energy, so is man impaled by the womb and after satisfactory copulation the acres become refreshed and experience renewed physical and mental energy. The world appears in a charming roseate hue.

Postures of copulation may be numerous. Many combinations are possible but in all there must be frictional contact of the penis with the vagina and clitoris and hips of both can move freely with ease except with the cooching posture and contact there are numerous limitations and degrees of variation. Lovers have to select one that gives them the closest frictional contact of the penis with the vagina and clitoris with utmost muscular ease of copulative movements to add to their pleasurable excitement and sensations. The commonest and the most agreeable position of sexual intercourse is face to face lying down with the woman on her back. Here there is not only intimate contact of the forced penis with the vagina and clitoris, hips can suck the hips, man can support his weight upon the elbows of his one hand, with the other hand he can entwine her neck, press her breast, and both can freely move their hips in varieties of rhythmic movements without the least muscular exertion. Here the husband takes the leading part. But this is not suitable where the man is big and ponderous, and the woman is small and slight built or pregnant. In that case the man lies on his back, with or without a pillow under his hips, his legs slightly bent to support the back of the woman. She sits astride with her trunk upright introducing the penis into her vagina and making the active movements herself. This is applicable where the husband is tired or the wife has advanced pregnancy. The man lies on his back and the wife is

uppermost, the penis pushed into the vagina, and lips locked together. The man sits erect with outstretched hips, legs dangle below. The woman sits on the hips, face to face, arms holding each other's neck, sexual organs and lips tied into each others. Some pregnant women prefer lateral position, lying side by side together, introducing the penis into the vagina, and remaining in close contact but without active movements, as long as seminal ejaculation does not take place. The later posture is customary among Swahilis of Zanzibar and Kamchatkans. The woman lies at the edge of a high bed, her upper part lying on it, the lower parts dangling, the man copulates in standing posture. Sudanese practise coitus in erect posture with the man standing against the woman, as among them vulva is much posteriorly situated. But many lovers in various countries exercise sexual intercourse in erect posture, face to face, the woman leaning against a wall or a tree. The Austriacs copulate in crouching posture face to face, both the partners squatting on their buttocks. The woman bends forward and stands on her legs and hands like a quadruped (*Kām Dhenuka* = Cow-like). Her partner puts his arms round her back, his face in front of her back bone, and he copulates with her posteriorly. This quadrupedal posterior copulative posture is prevalent among Siberian Innuits, Koniags of Assam, Papuans, any many Negro races, possibly because their vulva is much posteriorly situated. The woman lies face downward, putting a pillow under her lower abdomen. The man in kneeling posture or inclining on her back copulates with her. This dorsal decubitus posture of woman brings her clitoris in direct intimate frictional movement with the penis, and she experiences intense voluptuous sensation which she otherwise does not get.

The Time of Sexual Intercourse, most suitable for majority of persons, is possibly before retiring to bed, at last a couple of hours after evening meal. Detumescence and orgasm are sedative. They are followed by relaxation of body and mind, conducive to sleep, and decidedly antagonistic to work. Some, however, experience strong erection after first sleep. This is not unsuitable time if there are a few hours left for recuperation of energy. There are a few elderly people who have only morning erection with full bladder. This is quite unsuitable as daily morning activities will leave no time for repose which sexual orgasm induces, and which is necessary for restoration of physical and nervous vigour. Elderly people after heavy meals, especially if there is an inclination to arteriosclerosis must desist from sexual intercourse as there may be serious incidents. How often sexual intercourse should be performed? That depends on sexual glandular functioning, diet, mode of living, health, habit, age and inclinations. No two beings are alike in their glandular functioning. Consequently, their inclination and requirement vary. A well-bred cock will repeat

sexual intercourse 50 times daily, a sparrow 20 times in an hour, a bull 3 to 4 times in an hour. A well-nourished hyper-gonadic vigorous youth, who is not engaged in laborious exertion or occupied in serious intellectual pursuits, may perform coitus daily without any detriment to his health. But ancient law-givers, who had no knowledge of endocrinal physiology, even insisted upon the necessity of certain intervals between the acts of intercourse for the accumulation of semen. *Luther* prescribed intercourse twice a week (*die woche zweier*), *Mahammed* 8 days, *Zoroaster* 9 days, *Solon* and *Socrates* 10 days. The Hindu law books forbid sexual intercourse to a sickly, tired, fatigued, thirsty, hungry man or one whose bladder or colon is full, has evacuating tendency or just after a heavy meal. It is also forbidden in temple precincts, privies, in the presence of other people, in the morning or evening or festival days. The festival days are 17 in number as 8th lunation (*astami*), 14th lunation (*chaturdasi*), new moon (*amāvasyā*) full moon (*purnima*), and under the asterisms of *Jesthī*, *Mula*, *Magha*, *Aslesha*, *Revatī*, *Krittikā*, *Asvini*, *Uttara Bhadra-pada*, *Uttara Asāra*, *Uttara Fālgunī*. Intercourse is also strictly forbidden for the first three days of the menstrual period, but is enjoined on the fourth day or on its cessation as a conjugal duty, and as it is most likely to fertilize the ovum. Sexual intercourse is pleasurable and fecundating but causes loss of semen and energy. Sexual excesses provoke consumption and tuberculosis. Continence on the other hand induces congestion of sexual organs, nervous tension, dyspepsia and involuntary seminal emissions. However one should not have sexual intercourse with a menstruating or pregnant woman, one who has not been sexually roused, unclean, elderly person, courtesan, one who suffers from diseases in sexual organs, sterile or a vagabond woman. Coitus interruptus is also injurious to health.

Sexual intercourse can be enjoyed as often as one pleases if it is not followed by physical and nervous depression. Sexual excesses are particularly injurious to man as each act is followed by the ejaculation of semen which is a tonic and stimulant to the whole system. Women with strong heart can stand excesses much better as their vaginal epithelial lining is pretty strong. They have no ejaculation like that of semen. They rather with every sexual act absorb the semen which gives them tone and vigor. Majority of the women do not experience orgasm with the first sexual act of their husband, owing to premature ejaculation. It simply rouses their sexual erethism. Second and third acts give them the gratifying orgasm, causing relaxation of their pelvic congestion and nervous tension and inducing their sleep. Therefore with sexual excesses, man becomes a neurasthenic while his wife blooms in health. Her eyes brighten. Her faded pale cheeks

become rosy. She finds the joyous melodious notes in the harp of her body. But if she is wise, she must not fan the flame of her husband's sexual ardor and bring its early complete combustion through exhaustion. Economy during adolescence would prolong the sexual vigor up to sixth decade. It is wise that wife should sleep at least in a separate bed, if not in a separate room. If they sleep in the same bed, personal contacts and warmth of the body not only may disturb mutual sleep, but through physical contact and warmth of the body may provoke unnecessary sexual desires and erethism, thus leading to excesses. Generally the expansion of the vesiculæ seminales acts in the absence of an inhibitory voluntary influence, which is dormant during sleep or inoperative while sleeping with wife, reflexly on the nervous system. The latter responds to the excitation on the one hand by giving rise to the region of the sensorium dream like pictures of an erotic character, deprived from experience or imagination, and on the other-hand by producing vasomotor and motor impulses which lead to the erection, and if there is no copulation, the contractions of the musculature of the vesiculæ seminales themselves, and the ejaculatory accessory muscles—ischiocavernous and bulbocavernous—may give rise to involuntary ejaculation. But when excitation is increased by libidinous ideas and erection stimulated by tactile erogenous contacts, especially of the sexual organs, ejaculation may therefore occur though the vesiculæ seminales are almost empty, and the fluid hardly contains any spermatozoa. Such excesses may lead to physical and nervous asthenia. Sexual intercourse is to promote health and happiness and not to undermine them. Sexual desire is compared by some with hunger and thirst. This is misleading. Hunger denotes need of the organism for nutrition and thirst of the bodily needs for fluids to keep the blood in proper solution and to flush out the metabolic wastes through the kidney. While sexual desire may be artificially created by lascivious thoughts, suggestion or stimulation of erotogenic centres without accumulation of semen or ovarian tension.

Menstruating Woman has been regarded as unclean and intercourse with a menstruating woman has been forbidden by Judaism, Islam, Zoroastrianism and Hinduism. The Chinese and the Japanese observe the same custom. Many primitive peoples not only shun the touch, but even the sight, of menstruating woman. Savages of course believe that menstrual blood is caused by a wound of an evil spirit. But the rut of the animals corresponds to human menstruation. And the same phenomena occur as the congestion of the genital organs, their increased sensitiveness and the general nervous irritability. The rutting animals instinctively feel the urge of copulation. Menstruating woman distinctly feels increased sexual urge at the beginning, and highest point of

the sexual impulse is reached towards its end. Due to the suppression of this natural inclination, as demanded by superstitious customs, there is a mental depression and irritation. The æsthetic dislike of a possible pollution with blood and malodorous coagula adherent to the genitals can be easily removed by a lukewarm irrigation of water mixed with Listerine, Eau de Cologne or any other perfume. This is the time many women are sexually excited while in the intermenstrual period; they remain indifferent and frigid. And this is the most suitable time for fertility. But if there is chronic gonorrhœa, due to the congestion and diminished acidity of the vagina, there may be an abundant flora of gonococci. And she may reinfect her husband, while during intermenstrual period owing to the acidity of vaginal secretion which is destructive to gonococcus, there is no such risk. Perhaps this is the reason why all people generally shun intercourse at this time.

Sexual Intercourse during Pregnancy is forbidden by the Jews, Parsis, Hindus and Chinese. It must be abstained where there is a tendency to miscarriage, or in the last days of pregnancy when there is a risk of premature rupture of the membranes. Otherwise restricted periodical intercourse conduces to conjugal harmony and promotes health, if violence or pressure on the uterus is avoided. Once accustomed to sexual life, very few husbands can totally abstain from sexual intercourse during 8 or 9 months of pregnancy and about $\frac{1}{2}$ months of involution of genital organs after parturition when it is imperative. The pregnant wife due to congestion and engorgement of the genital organs, excessive growth of the uterus, hypersecretion of the pituitary, thyroids, suprarenals, nervous tension, leucorrhœa and pruritus of the vulva feels the sexual urge. Possibly sexual union is useful for herself and for her fetus which she is sustaining; there is a need for a stimulus, and semen by its absorption through the vaginal epithelium and uterine mucosa supplies the tonic force. So it directly benefits the mother, her embryo, and indirectly the father through detumescence, and release of the sexual tension, and the soothing and relaxing effect of vaginal pleasant contact and secretion. It also conduces to conjugal fidelity. If the wife does not respond, the husband may cohabit with loose women, become venereally infected, and transmit the infection to his wife. Some husbands do not like intercourse with roomy secreting vagina and œdematous vulva. But injections with lukewarm alum water or Listerine will stop secretion and contract the vagina. To avoid pressure on the uterus, lateral or sitting postures are better suited for the purpose. The wife can recline the upper parts of her body on high bed, legs dangling below, and the husband copulates by standing position.

Intercourse during puerperal involution period, as long as lochial discharge continues, which is about 4-6 weeks, should be strictly forbidden. The Jews, Parsis, Hindus and Chinese regard the woman

the appearance of a dark band near the centre of the nuclear spindle. A clear space at each end of the spindle then develops threads which run to the surrounding yolk substance, the sun-like appearance thus produced being termed the *amphaster*. The nuclear spindle now assumes an upright position, the chromosomes divide, each half travelling towards its corresponding end of the spindle, while the spindle itself surrounded by protoplasm advances to the surface of the ovum and pushes outward one-half of its entire substance into the perivitelline space. This extruded portion then becomes constricted off from the rest of the spindle and forms the first *polar globule*. The remnant of the spindle of the ovum then a second time undergoes similar changes and forms in the same manner a *second polar globule*. As the two attraction spheres (*poles*) separate they appear to draw out the intervening cytoplasm into a spindle of fine fibrils. The tangle of fine threads of the nucleus has resolved itself into a number of readily distinguishable filaments which become progressively shorter, assuming the appearance of stout blocks of chromosomes. The chromosomes arrange themselves at the equator of the spindle and split into longitudinal halves. Each half passes to the opposite end of the spindle, and while constriction of the cytoplasm occurs, the daughter chromosomes spin out again into finely-spun threads. Thus each of the chromosomes of the cell appears to be structurally related to a corresponding chromosome of the preceding and succeeding generation. The whole process is known as mitosis. Thus three fourths of the original spindle is cast off to make room for the male element, and the remnant of the spindle is reformed into *female pronucleus*.

An adult man injects about 100 to 600 millions of spermatozoa during his orgasmic ejaculation into the vagina, the quantity of semen varying from 0.75 to 6 c. c., depending on his seminal accumulation. A human spermatozoon is 0.05 mm or $\frac{1}{300}$ of an inch, including its long celiun or tail. A drop of semen is like a stirred up ant-heap, full of movement. Influenced by the whip-like lashings of the tail the spermatozoon moves steadily forwards. The chromatin of the nucleus develops into the head of spermatozoon. A part of the *ids* forms the acrosome. The centrosome takes part in the formation of the neck, the middle piece and the axial filament. The cytoplasm gives rise chiefly to the axial filament. Its mitochondria form the spiral structures and it takes part in the formation of the tail. Its chromosome threads undergo transformation and form the spindles like that of the ovum. After leaving the testes the spermatozoa undergo a further *ripening* process which consists chiefly in the completion of the outer envelope of the middle piece and smoothing off of any projections or irregularities that may have remained after separation from the Sertoli cells.

When the spermatozoa and ovum meet as a rule in the outer third of the Fallopian tube, the former penetrate the zona radiata, and the first spermatozoon which approaches the vitelline radially is met by a slight protrusion of its cytoplasm, which it penetrates, and passing inward, enters the yolk. Here the spermatozoon loses its tail, and the head and the middle piece, composed largely of chromosomes, become the *male pronucleus*. But one spermatozoon is only necessary for fertilizing the ovum, and as soon as this has penetrated the yolk, a repellent action is set up whereby other spermatozoa are prevented from passing inward. By the biotrophic attraction male and female pronuclei approach each other, their walls come in intimate contact, fuse, forming a single nucleus, somewhat smaller than the original ovum—*segmentation nucleus*.

At this fertilization the normal number of chromosomes—bearers of parental heredity—is restored by the union by the nuclei of the ovum and sperm, so that each ordinary cell of the newly formed organism has a set of chromosomes, half of which are of paternal, and half of maternal origin within the segmentation nucleus, the reduction division is preceded by the lateral approximation of the chromosomes in pairs (*synapsis*) during the prophase. Each pair behaves as if it were a single chromosome in metaphase so that the result of division is the resolution of each pair into the component chromosomes. The human female ovum has 24 equally paired chromosomes. The human male sperm has 23 equally paired and one unequally mated (xy) pairs of chromosomes in the unreduced nuclei. Thus two types of sperms are produced, the x-bearing, producing the female and y-bearing producing the male. Thus in the male there would be 47 x-bearing chromosomes and one y-bearing chromosome. In the female there would be x-bearing 48 chromosomes, 24 from the mother and equally 24 from the father. So the sex determination does not depend on the nutrition of the ovum or the embryo, but on the accidental fertilization by either x- or y-bearing sperm chromosome. Chromosomes become twisted in the process of pairing (*synapsis*). The bivalent chromosomes of the first reduction division are formed by the side-by-side union (*para-synapsis*) of the elements of each chromosome pair. Immediately after the last telophase proceeding the reduction (also called *heterotype* or meiotic) division, chromosomes in the form of attenuated loops with their free ends oriented towards one pole present the appearance of a bouquet, this is the *leptotene* stage. These are seen to be laterally associated in pairs in the succeeding *zygotene* or *amphitene* stage. They next become shorter, more intimately associated and contracted to one side of the nucleus, so that the number of loops is now, by fusion of adjacent pairs, half the number of the *leptotene* stage. This is the *pachytene* stage. The loops now assume a well-marked longitudinal fission in the plane of

fusion, become detached from their polar orientation and often display twisting of their longitudinal halves. This appearance is known as the *proplotene* or *strepsitene* stage. When the spindle appears and the nuclear envelope is lost, the longitudinal halves of the diplotene filaments have travelled apart and very much condensed to form the characteristic spindle-type chromosomes of the first reduction division. The object in an ovum or gamete which determines the colour is called a *gene* or factor. A zygote possessing two like *genes* (as yellow and white) is called *homozygote*, one possessing two unlike *genes* (cream) is called *heterozygote*. Two *genes* which can form a pair of this kind are called *allelomorphs*.

Due to linkage and twisting of chromosomes and genes in zygote, *dominant* and *recessive* characteristics are formed. Dominant hereditary abnormalities run in many families. A dominant character is handed down, only by an affected individual and to about half of his or her children. Among anomalies of the eyes, dominant inheritance includes myopia, two or more types of presenile cataract, *retinitis pigmentosa* (in certain families), acute glaucoma and night-blindness (in some families). Other dominant characters include several ear and skin diseases, diabetes insipidus and other metabolic diseases. In some cases the inheritance may be irregular. Thus acholuric jaundice is strongly hereditary, but occasionally transmitted through unaffected individuals. But they have abnormally fragile red-blood corpuscles, and it is this character which is actually inherited, though a person displaying it may escape the manifestation of jaundice. A number of malformations, such as brachydactyly (absence of one bone in each finger) and lobster claw (absence of all digits except sometimes the thumb and the little finger) are inherited as dominants. It may be accentuated in homozygous form. Thus a marriage between cousins with a hereditary shortening of one finger produced a child without hands or feet. Another great group of abnormalities are sex-linked recessives. They are very much commoner in males than in females, and are not passed on by affected males to their children, though their daughters who receive an abnormal X-chromosome from them hand the character to half their sons. The most serious condition in this way is hemophilia, a failure of the blood to clot which generally leads to death by hemorrhage. A very common group of characters inherited this way are the four types of colour-blindness, namely protanopia (red-blindness) and its milder form protanomalopia, deutanopia (green-blindness) and its milder form deuteranomalopia. *Retinitis pigmentosa* (in certain families) and atrophy of the optic nerve are also sex-linked recessives.

Quantitative as cranial index, stature, forearm, eye and hair colour are due to a number of genes, and such characters show the following correlations — brother with brother, or sister with sister, 52 p.c., one parent

with son or daughter 46, grandparent and grandchild 27, uncle or aunt and nephew or niece 25, first cousins about 15. Monozygotic twins, formed from the same fertilized ovum resemble each other far more closely in physical and mental characteristics, though separated from each other from childhood and brought up in different environments, than dizygotic twins or ordinary brothers and sisters.

The inheritance of parental acquired characteristic is a complicated problem. The Egyptians and Jews have been circumcising the prepuce of their male children for more than three thousand years. The hymen of women is ruptured usually in the first sexual intercourse. Yet these mutilations are not inherited. A blacksmith's son is not born with the strong biceps of his father. A Dutch woman whose skin is tanned by South African sun produces a blond baby. Yet we know that a foster child resembles more his blood relations in tastes, temperament and intellect than his foster-parents, though living in their environment. By artificial and methodical breeding animal breeders have improved the quality of wool, quality and quantity of milk, quality and flavour of meat, speed of horses, hunting power of dogs, fertility and weight of hogs, and have preserved them. Horticulturists have improved many fruits, with smaller stone, larger luscious flesh, fine keeping power, and have preserved them. Seedless oranges and grapes are fine examples of the value of artificial methodic selection of stocks. Crab apple is but an acrid prune. But a modern apple which has originally sprung from crab apple is a fine appetizing fleshy luscious sweet fruit with delightful aroma. Wild rose is a floweret. But a modern garden rose is a thing of beauty and joy. Florists know how to add colour, fragrance and petals to a flower by judicious selection of strains. If plant breeders, horticulturists and florists have already accomplished so much to improve domestic cattle, sheep, hogs, horses, dogs and cats, horticulturists with vegetables and fruits, florists with blossoms, there can be no question about the inheritance of acquired characteristics. Only further investigations about the biological science, particularly about heredity, are needed to find out the laws of inheritance. And there is no reason that man, lord of all creations, by judicious selections of best strains, should not be able to produce *superman* type. But human females are not like animals or plants. They have their personal likes, dislikes and selection. They cannot be forced to sexual union against their will. They have to be taught the value of selected matings for having better type of offsprings, for racial improvement and human progress. Victors of Olympic Games, athletes, poets and orators were often invited to have intercourse with married women by their husbands to produce a better class of citizens in Sparta. That made Spartans, mostly Alpines, one of the most beautiful, energetic and disciplined races of the world. Can modern women be induced to marry

for mutual sexual gratification, companionship and protection, while for procreation they can associate with best men they know and admire? But will such men hire themselves like stud bulls or stallions, even if women desire such temporary unions for eugenic value of their children? It may be possible that their fresh semen may be available in reliable Biological Eugenic Laboratories with proper labels of their heredity in tubes which may be purchased by any woman and injected with a syringe into her uterus during her ovulation period. For the improvement of the race it is not enough to prohibit the marriage or sterilize the epileptics, insane, syphilitics and criminals. There shall be also better selection from among the fittest. Is it not strange that man pays so much attention to the improvement of cereals, vegetables, fruits, milch cows, sheep, horses, dogs, and cares so little for the betterment of the human race? Yet that *superman* type is coming and will lead the world.

The *segmentation nucleus* now enters upon a new stage of development in which the entire egg-cell is broken up into a greater number of smaller cells, each of which possesses a nucleus. This total division of the ovum is known as *holoblastic* segmentation, the individual cells of which are called *blastomeres*. This change first affects the segmentation nucleus which divides by the indirect method (*karyokinesis*), and forms two nuclei. A groove then appears in the axis of the ovum, marked by the polar globules, which by continuous deepening completely divides the ovum into two cells. A second meridional cleavage plane divides the two cells into four, the four are then divided into eight, then into twelve segments, and the process continuing the ovum is finally converted into a mass of cells, which from its resemblance to the fruit is called *Morula* or mulberry berry. The process of cell divisions, although described as equal, is not so in fact, for the external divide more rapidly than the internal so that there can be differentiated two distinct layers. Vacuolization in the cells at one pole of the ovum now takes place and these spaces running together, a small cavity, the segmentation cavity, is formed in the interior of the mass. This is later filled with a clear albuminous fluid, which increases rapidly in amount, so that ovum soon becomes distended into a vesicle, the *Blastodermic vesicle*. The ovum has now increased in size to be visible to the naked eye.

Ovum may be compared with unicellular *amceba*. It becomes multicellular passing through gastrula, annelid, fish-grill, amphibian and mammalian stages of growth. The growth is rapid. From $1/120$ of an inch in size the ovum has grown ten times as big in two weeks, $1/12$ of an inch and weighing about one grain. By the end of the month the embryo is already $1/2$ of an inch long. Visceral arches and clefts are already distinguished, Spinal canal closes. Buds of rudimentary extremities appear.

There are indications of eyes, anus and mouth. The heart is $\frac{4}{10}$ of an inch long. At the end of the second month, the embryo is 1 inch long. The eyes, nose and ears are distinguishable. There are suggestions of hands, feet and external genitals. At the end of the third month, the embryo is about the size of a goose-egg. Fingers and toes are separated. Nails are like fine membranes. Neck separates head from body. Sex is distinguishable. Uterus is formed. Length about 5 inches, weight about 11 grammes. At the end of the fourth month the size is about 6 inches long, weight 57 grammes. Short hairs—lanugo—present. Head is equal to about $\frac{1}{4}$ of entire body. At the end of the fifth month, the embryo is about 10 inches long, and 8 ounces in weight. Vernix caseosa forming. Eyelids begin to separate. Heart sound perceptible. Quickening takes place. At the end of the sixth month the embryo is about 12 inches long, 23 ounces in weight. Hair on head. Eyebrows and lashes. Testicle near rings. At the end of the seventh month the embryo is about 15 inches in length, 41 ounces in weight. Pupillary membrane disappears. At the end of the eighth month the embryo is about 16 inches long, $3\frac{1}{2}$ pounds in weight. Left testicle descended. Nails do not protrude beyond fingertips. Lanugo begins to disappear.

Pregnancy occasions in woman a certain amount of bodily suffering, principally due to the fact that the foetus lives as a parasite at the expense of the mother and that it incessantly draws from the maternal body not only for the formation of its own body (excepting the nucleus and momentum given by the impregnating spermatozoon) but also for its metabolism. Thus mother's body is to supply calcium for the bone formation of the growing embryo and other minerals for its structural growth. Mother's body has to supply nutrition for its development. So not only mother's reserve may be exhausted by this demand, but mother's body may be called upon to supply the necessary materials. This causes an increased demand of nourishment, to digest which there are increased activities of gastric, intestinal secretory organs. Hypersecretion of pituitary gland pituitrin—increases the amount of hydrochloric acid in the stomach. But if the pregnant woman does not get sufficient meat in the morning or stomach remains empty, due to hyperacidity there is giddiness, nausea and acid vomitings. To counteract hyperacidity there is a craving for eating chalk or charcoal. Excessive consumption of carbohydrates aggravates digestive trouble by causing acid fermentation of the stomach. If liver is deficient in functioning to destroy the metabolic products and kidneys excretory function is weak to eliminate metabolic wastes there is constitutional trouble. The increasing weight of the pregnant uterus creates many disturbances of purely mechanical nature, interfering with the movements of the body, and being a constant burden to the dorsal region. The greater

luminousness stretches the abdominal walls, causes subcutaneous ruptures in them, produces overtension of the abdominal muscles which prevents a re-establishment of their original tonicity, while the abdominal pressure is during pregnancy diminished. The bladder is also encroached upon and its capacity decreased, there is an increased pressure upon the intestines and especially upon the rectum, the function of which is rendered difficult. The sympathetic ganglia in the abdomen are irritated through the tension and displacement through mesentery. Moreover the intra-abdominal pressure, occasioned by the crowded state of the organs hinders the return of the blood into the large abdominal veins and produces a congestion in the regions supplying them.

Though the organism is capable of adapting itself to a certain extent to these objective changes, as woman's body has been fashioned for reproduction, yet it all depends on the health, vitality, and nutrition of the maternal body. The increased consumption of food, to supply the requirements of two individuals, may produce digestive disturbances. Where the quantity of food consumed or assimilated is not sufficient to compensate for the greater expenditure, the nutrition of the body suffers. Emaciation and hydræmia (serous plethora) appear inspite of the attempts of the organism to compensate it by the increased production of white corpuscles in the blood (leucocytosis). The overloading of the blood with the metabolic wastes of two individuals—the maternal and foetal—may produce albuminuria or uræmia if the function of kidney is not equal to the task. The consequent destruction of a large number of red blood-corpuscles produce pigments which manifest themselves in the areola of the breasts, abdomen, vulva, nymphæ and perineum. The diminished functioning of the kidney and capacity of the bladder, and the nervous excitement by the hypersecretion of the thyroids cause restlessness and disturb sleep. The increased pressure upon the abdominal veins causes varicosities and œdema, especially in the genitals and in the lower extremities. Sympathetic nerves being irritated through mechanical pressure may stimulate the intra-pelvic nerves and affect the nerve centres of the lumbar enlargement of the spinal cord. Among the symptoms, severe pains are prominent, either continuous or intermittent within the pelvis and in the sacral region, accompanied by a sense of weight and pressure in the abdomen or by dragging pain in the region of the hips, in the gluteal region, in the outer and back parts of the thighs, in the inner surface of the legs, in the calf in the dorsum of the feet and heel.

After the cessation of menstruation, the uterus, the normal site of implantation, presents changes in its size, form, position and structure. From a small pelvic organ in unpregnated state about $1\frac{1}{2}$ ounce in weight, the uterus occupies a large part of the abdominal cavity, weighing

about 1 kilo. The enlargement in early months is due to the hyperactivity of Corpus Luteum, for even in extra-uterine pregnancy, similar enlargement takes place. In the later months foetal growth is the chief factor in the uterine enlargement. Enlargement of the abdomen begins after the third month as the uterus rises. In the second month the hypogastric region is flatter and umbilicus deeper than normal. Along the median line of the abdomen a dark-brown pigment is traced from the pubes around the navel and up to the ensiform cartilage. It is discoloured most in those with darker skins, and is $\frac{1}{3}$ to $\frac{1}{2}$ inch in width. It is part of the pigment dropped in places where capillaries are few, along the front of the foetal closure line, on the abdomen, vulva, nymphæ, and perineum. Streaks or striae (*linea alba*) appear in the lower abdomen, resulting from the stretching of the skin. They are wavy and irregular and commonly lie in concentric zones below the umbilicus. The fundus may be felt as it begins to rise two or three fingers above the symphysis in the fourth month, in the sixth month the navel is reached. Venous congestion from the hypertrophy of the vessels runs up the entire vagina. Dusky discoloration is visible on the anterior wall below the urinary meatus. The purplish color of the vaginal portion of the cervix may be observed almost from the first month. The livid color of the vagina may be seen in the second or third months. Late in pregnancy the genital organs are relaxed, soft and swollen, while moistened by mucous secretion. Enlargement of the breast with throbbing, tingling, stretching fullness or secretion, may be felt with tenderness of the nipples. The breast enlargement of pregnancy differs from simple fat deposit by the firmness, knot and uneven character to the touch. This is due to increase in size and a number of the glandular lobules, swelling of the connective tissue and increased deposit of fat between the lobules. The veins enlarge, forming a blue tracery under the skin or slightly elevated above it. They run across the breast and into or around the areola. To bring them out fully the centre of the breast may be circled with pressure for a moment. The darkened base on which stands the nipple becomes the seat of dark brownish pigment. The elevation and wrinkling of the areola is produced by the increase in sensibility and size of the subareolar muscle. Pressure on the breast and a moment's dexterous stroking of the ducts running toward and beneath the areola will bring the colostrum after the third month. It is slightly opaque or yellowish.

The Vagina shows the effects of congestion to a marked degree by a tending reddish discoloration, especially in the lower part of the anterior wall which often protrudes through the introitus. The touch of the walls is slightly relaxed, the upper part of the mucosa is hard and oedematous up to the external os.

feeling. The secretion is also increased. The veins are dilated. The labia are swollen and varicosities appear, especially in multiparæ. The bladder from the pressure of the uterus and hypersecretion of the pituitary manifests hyperæmia and increased frequency of micturation, especially in primiparæ. The liver and spleen are enlarged. The thyroid gland shows both hypertrophy and hyperplasia in the fifth or sixth month in primiparæ, and comes to the normal after parturition. The sebaceous and sweat glands become activated. The bones show changes in the appearance of so-called osteophytes, physiological precursor of osteomalacia, frequently upon the inner surface of the cranium of the region of the middle meningeal artery, if there is deficiency of calcium and its reserve is depleted, then also dental caries become frequent.

Diet is an important factor in the health and vitality of expectant and nursing mothers. A large amount of sickness and disability associated with childbearing and high mortality rates of mothers may be substantially reduced by proper selection of food and improved feeding of these women. The food should be optimum of all kinds and varieties in appetizing and easily digestible forms at regular intervals. But it is desirable to avoid overloading the intestinal track. It is a good plan therefore to limit the amount to be taken at each meal, and if necessary, to increase the number of meals. There is no harm to give indulgence to the caprices of taste and appetite as long as sufficient nutrition is taken for daily needs. Capricious hunger for sour, bitter, alkaline foods or chalk may betray the subtle starvation of some salts, vitamins or some chemical substances for the body. And the body thus demands their supply. During pregnancy and lactation, the expectant mother has not only to be supplied with all the nutritional factors necessary for her own health, but also to provide many minerals and basic substances for the development of the growing fœtus and body. White bread and polished rice make the diet of majority of pregnant women poor in calcium salts. The mother has to sacrifice the calcium salts of her own bones for the developing fœtus. This deficiency if slight may cause the dental caries of the mother, and if excessive it may result in osteomalacia. Other distressing complaints during pregnancy, which are apparently related to defective calcium nutrition, include muscle soreness and weakness which is not relieved by rest during the day or sleep at night. There may be muscular spasms and contractions, causing severe pain, and there is inability to sit or lie in one position for long. So every pregnant woman should take at least a quart of milk daily with one or two egg-yolk. There is also iron deficiency in the food of many pregnant woman, as they have to supply a large quantity of iron to the growing fœtus. Consequently they suffer from anæmia. So foodstuffs rich in iron such as meat, egg-yolk, spinach, peas,

potatoes should be regularly given. The proper supply of iodine to the pregnant woman is of great importance. Only a small amount is necessary. But that is vital to the proper functioning of the thyroid gland of the foetus, or the baby may be predisposed to simple goitre, or if sufficiently severe to cretinism. Sea-fish is the only rich source of iodine, and wherever possible it should be given to the pregnant woman twice a week. The milk and cream of green coconut also contains a trace of iodine. Wherever sea-fish, seaweeds or green coconut are not available, iodized salt—one part of sodium iodide mixed with 200,000 parts of sodium chloride—may be added to the diet. Unpurified sea salt contains also a trace of iodine. Plenty of fruits should be taken for vitamins and for their laxative effect. Breakfast should be taken early on rising to avoid hyperacidity, nausea and giddiness.

In normal pregnancy light exercise is good, refreshing and stimulating. Walking on the roof, in the park, in the open air is the safest and best. Overstrain should be avoided. Regular bath is not only refreshing, it has also a stimulating effect. It removes metabolic wastes. Clothing should be loose-fitting and comfortable. Teeth should not only be regularly cleansed, but if there is any deposit, it should be periodically removed. Rotten teeth should be removed. They cause flatulence and indigestion. With every morsel of food bacteria are swallowed. The use of vaginal douches is unnecessary if there is no abnormal discharge. The ordinary white or yellowish discharge (leucorrhoea) often comes and goes in proportion to general health. During pregnancy the monthly period should cease. Occasionally a slight mucosanguine discharge may be observed in the first and second months. If there is vulvitis douches of mild solution of boric acid or Listerine may be given. Sexual intercourse may be indulged in moderately without causing any pressure on the uterus and abdomen in lateral or sitting postures.

XI PAINS OF LOVE

A pregnant and parturient woman sports with death. Yet motherhood is the fulfillment and glory of woman's life. A smiling baby and a healthy intelligent child occupies a large space of a *happy home*. With motherhood woman graduates into spiritual life. Parenthood spiritualizes marriage with a sense of duty and outlook of the future. A child radiates joy, health and harmony in the home. It forms the holy trinity with father and mother. This family triad—Isis as mother, Osiris as father and Horus as child—was worshipped in ancient Egypt as **Harpocrates**. But child-bearing and child-delivery are no delightful bed of roses like lover's embrace. The passage of the child through

the pelvic arc of life causes intense labour pains, more or less physical lacerations and contusions

The period of gestation

<i>Animal</i>	<i>Period</i>	<i>Animal</i>	<i>Period</i>	<i>Animal</i>	<i>Period</i>
Hen	21 days	Cat	8 weeks	Deer	38 weeks
Duck	21 "	Dog	9 "	Bear	39 "
Mouse	24 "	Fox	9 "	Apes	39 "
Goose	29 "	Wolf	10 "	Woman	40 "
Hares	32 "	Lion	14 "	Horse	11 months
Rat	5 weeks	Pig	17 "	Camel	11 "
Stork	6 "	Sheep	21 "	Rhinoceros	18 "
Guinea Pig	7 "	Goat	22 "	Elephant	24 "

Three factors are concerned in the mechanism of labor—the expelling powers, passages and the passenger. The chief expelling power is the contraction of the muscular walls of the upper uterine segment, provoked by the hypersecretion of the pituitary gland which sympathetically stimulates the uterine motor centres in the medulla oblongata and lumbar portion of the cord. These contractions cause dilation of the lower segment of the uterus, reinforced by intra-abdominal pressure for the expulsion of the foetus. The contractions are peristaltic, the wave beginning at the fundus or at cornua, and sweeping almost instantaneously over the contractile segment. The contractions are intermittent. At the beginning of labor they recur at intervals of 15 to 30 minutes. The intervals shorten as labor progresses, and at the acme of expulsion they do not exceed usually 2 to 3 minutes. Frequently at the close of the perineal stage they are practically continuous. The force of the contraction may range from 15 to 50 pounds.

The irregularly funnel shaped and flattened pelvic bony basin is the arc of life through which the foetus must pass through its passage from its mother's womb. A barely perceptible mobility of the pubic bones upon each other is generally present in the last weeks of gestation. Sacro-iliac articulations are sufficiently movable to permit a separation of the pubic bones to the extent of 5 to 7.5 cm—2 to 3 inches—after section of the symphysis, without injury to anterior ligaments. The sacrum too is capable of rotation in some degree on a transverse axis drawn through its base a little below the level of the promontory. Not only is there a hinge-like motion at the sacro-coccygeal joint, but contiguous segments of the coccyx have some degree of mobility upon each other. Owing to the swelling of the intra-articular structures which obtains in all the pelvic articulations toward the close of pregnancy, some expansion of the pelvic planes is possible during labor under the wedge-like action of the foetal head. Marked differences in the form and size

of pelvis are observed according to races, development and nutrition. The pelvic brim of the Alpine is oval. The Aryan type consists in a relative elongation of the antero-posterior dimensions of the pelvis compared with the transverse. The pelvis of the Austric is nearly circular in horizontal outline. In the Mongoloid the antero-posterior equals the transverse diameter. Poor classes of people who had malnutrition during their growing period suffer from contracted, dwarfed, deformed, osteomalacic, scoliotic, kyphotic pelvis.

The Foetal head, the upper part of the trunk and the breech fill the pelvis more or less completely during its passage through it, and each has sufficient rigidity to retain its primal shape in some degree during labor. The head however is much larger in proportion to the trunk in the foetus than in adult. Its diameters are greater than those of shoulders or the breech and thighs, and are more incompressible. It follows that the principal resistance to the passage of the child through the pelvis is offered by the head. And the head is getting larger with the intellectual progress of man. The foetal head presents two general divisions—the cranial vault, and the cranial base and face. The cranial vault, owing to the semi-cartilaginous character and mobility of its bones, is plastic, a fact of great importance in facilitating the passage of the head through the pelvis. The bony structure of the cranial base and face, on the otherhand, is firm and unyielding, being highly ossified and more firmly united, protection thus being given during birth to the ganglia at the base of the brain. The degree of ossification and the firmness of union between the cranial bones are subject to considerable variation, and the hardness of the head is an essential element in the labor. The vertex position presents in about 97 p c of all labors at term, the breech 16 p c and transverse or shoulder position in 05 p c cases. The preponderance of vertex presentation is due mainly to adaptation of the foetal ovoid to the shape of the uterus, and in some degree to gravity, the cephalic being the heavier extremity of the foetus.

The average duration of labor is 15 hours in primiparæ and 9 hours in multiparæ. Contractions of the uterus occurring during labor are painful. And suffering is intensified by the distension of the cervix, stretching of the vagina and vulva and compression of the nerve trunks in the pelvis. The dilation of the cervix is caused in addition to the contraction of the longitudinal fibres of the uterine segment by softening of the cervical tissue and hydrostatic pressure of the bag of waters. The cervical and vaginal secretions become profuse as labor is established. They serve as a lubricant to the passages in preparation for the expulsion of the foetus. Blood-stained mucous discharge hanging about the vulva and the pubic hair indicate that the expulsion of the foetus has begun. After partial dilation of the cervix and the formation of the bag of waters

the head sinks into and partially occludes the lower uterine segment. The main body of liquor amnii behind the head is termed the hind waters, that in advance of it the forewaters. Under the pressure developed in the hindwaters during the uterine contraction the head advances as the sac of forewaters protrudes. On full dilation of the cervix, the membranes usually rupture. Rupture of the bag of water is announced by a gush of water from the vagina. The quantity of liquor amnii expelled depends on the extent to which the lower uterine segment is occluded by the presenting part. After the membranes rupture the head descends with a moving force which is measured by the propelling power less the resistance of the birth-canal. So long as the waters have not all escaped the expellent force is transmitted to the head in part through the liquor amnii. After the waters have drained away, the foetal parts are consolidated in a compact mass by the grasp of the uterus, and the propelling force is transmitted in great measure through the entire foetal ovoid. The lateral compression exerted by uterine contractions act to steady the foetal mass and also add to the extruding force. The descent of the head is due in part of the fact that the elongation of the foetal ovoid under the compression of the uterine contractions is somewhat greater than the elongation of the uterus itself. When the occiput has reached the pelvic floor, the cavity of the pelvis is fully filled, and the pressure of the head upon the bowel gives rise to marked rectal tenesmus. The sphincter ani becomes relaxed and one or more fecal evacuations usually take place as the head passes over the pelvis. The contractions of the abdominal muscles toward the close of the expulsive stage are reflex and wholly involuntary. As the head descends the vulvar ring, the pains become very intense. A brief pause ensues on the birth of the head. After a moment or two of rest, contractions recur, and the shoulders pass, then the body, followed by a gush of bloody amniotic fluid, is expelled.

After expulsion of the baby the uterus grows smaller by retraction and closes upon the placenta. When active contractions are resumed after a few minutes, the placenta is gradually detached. Detachment may begin over the central portion of the placental seat. Then as the uterus relaxes, a retroplacental blood collection is formed. With each succeeding contraction, the area of detachment is increased and the blood collection grows accordingly. The liberated portion of the placenta is thrust downward toward the cervical opening, or the vagina, and when the tonicity of the abdominal and pelvic floor muscles has not been too much impaired, may be expelled through the vulvar orifice by its amniotic surface. The placenta at full term weighs about $1/6$ to $1/4$ of the baby's weight, and it is more or less circular with a diameter of 7 inches. After

the expulsion of the placenta there is a pause of variable length in the uterine contractions. These contractions are known as **after-pains**. They are not usually painful in primiparæ. But in multiparæ, they may be distressful. After-pains are due to the retention of blood-clots in the uterus. This occurs more frequently in women who have borne children, owing to greater relaxation of the multiparous uterus. In the presence of blood clots the uterine contractions become violent in order to expel them.

Care of the Baby :—On birth of the head, the face especially the eyes, have to be cleansed by the nurse with a saturated boric acid solution. If there be any suspicion of gonorrheal vaginal discharge a drop of 2 p c solution of protargol should be instilled into each eye as a preventive against ophthalmia neonatorum. On the complete expulsion of the baby steps should immediately be taken to establish fully the respiratory movements. Mucus in the pharynx may be removed with the finger wrapped with a soft wet piece of cloth, or sucked up into a soft rubber tube with a rubber bulb attached. Holding the infant suspended by the feet favours drainage from the respiratory tract, should it contain liquor amni or blood drawn into it by premature attempts at respiration. The contact of cool air with the moist surface of the body, as well as the air hunger created by the partial interruption of utero-placental circulation, usually excites respiratory movements. Directly after birth, should the infant not promptly begin to breathe, the action of respiratory muscles may be stimulated by gentle flagellation over the buttocks, or by dashing a little cold water upon the face and the chest. The head should be brought into proper shape by the pressure of the hand. Even in normal labors, the head undergoes more or less adaptation while passing through the bony pelvic arc. Under the pelvic pressure forces, the diameters in the grasp of the resisting girdle are reduced, this reduction being compensated by elongation of the cephalic mass in the direction of the birth-passage. The parietal bones overlap the occipital, sometimes also the frontal, and one parietal bone may overlap the other. The engaging diameters are thus diminished to the average extent of 6 mm ($\frac{1}{4}$ inch). The degree of moulding depends on the relative size of the head and the pelvis, the plasticity of the cranial vault and the force of the pains. Plasticity varies with the extent of ossification. Moulding is an essential element in the mechanism of the expulsive stage of labor, not only by reason of adaptation of head to pelvis, but also because elongation of the head favours normal rotation by increasing the dip of the leading pole. The *Caput succedaneum* is an oedematous swelling, caused by the rupture of the membranes, though the pressure of uterine contraction. The vessels of the foetal mass under pressure become engorged during the pains, and a serous exudate takes place into the cellular tissues of the

fecal surface. The size of the caput succedaneum therefore varies with the degree of force which produces it. It is likely to be large in prolonged and difficult labors. The **ligation of the cord**, should, as a rule, be delayed till the baby is breathing freely. The infant thus gains from one to three ounces of blood. This post-natal afflux of blood is due to the force of thoracic aspiration. Though it is of little importance to robust infants, but it is often of vital consequence in premature and feeble babies. The utmost aseptic care must be observed in ligating and dividing the cord. The infant after being bathed in lukewarm water is to be dressed in flannel and put to bed.

Puerperal Period indicates the time which elapses after childbirth during which the genital changes that take place in the course of pregnancy on labor are being involuted, and the reproductive organs are returning more or less to the state it was before pregnancy. In the case of women who have previously borne children, the condition reached at the end of the puerperium should, except as regards the inevitable local changes, be that observed before the last pregnancy. In the case of primiparae, the previous nulliparous condition is never regained. Certain changes have taken place in the genitalia and in the abdominal wall which are permanent, betraying signs that at least one labor has occurred. After the expression of the placenta careful inspection of the vulvar orifice is necessary for possible lacerations. Notable injuries should be immediately treated. External genitals should be thoroughly cleansed. Pledgets of sterile cotton wool, soaked in 1 per cent lysol solution should be used to wipe out parts by parts, and to remove blood clots that cling to vulvar hairs. All soiled linens should be removed from the mother and the bed. The vulva is to be covered with an aseptic dressing. Its object is to receive the discharges, and through frequent changing, to promote the cleanliness of the external genitals. A moderately firm bandage about the abdomen adds to the comfort of the patient after labor. It keeps the legs together if the perineum has been torn. Puerperal woman suffers frequently from flatulence, and a binder opposes the distension of the abdomen. The puerperal woman has been aptly compared to person suffering from a recent more or less severe wounds. But if the wounds can be kept aseptic, beyond the weakness caused by pains, loss blood and a certain amount of nervous shock, there is nothing to interfere with speedy recovery. In the puerperal woman there are open wounds extending over a large surface, contused, bruised and lacerated genital mucosa which is no longer a barrier to bacterial invasion. The lochial discharges and the blood clots in the uterine sinuses at the placental site form excellent media for bacterial growth. **Lochia** is the fluid that oozes from the placental site principally, but also from the walls of the uterus and from the lacerations of the cervix, vagina or

perineum. It is largely blood for three or four days, and is called *Lochia Rubra*. From the fourth to the seventh day it assumes more the nature of serum called *Lochia Serosa*. Afterwards it becomes white—*Lochia Alba*. The *Lochia* ceases usually about the 14th day. The common bacteria of **Puerperal infection** are streptococci, staphylococci, bacillus *Coli* and gonococci. They live readily in lochia, retained bits of placenta, membrane, blood clots and lacerated surfaces. To overcome them and their toxins, the body as a reaction produces bactericidal substances, opsonins and antitoxins in the blood plasma. This reaction of bodily defence is expressed by fever. Streptococci, staphylococci and gonococci are not much affected by bactericidal substances, but are readily opsonized and ingested by phagocytes. *Bacillus Coli* is killed by bactericidal substances and opsonized. The toxins of all of them are neutralized in the body by antitoxic substances. But if the body's defences and power of resistance are weak, general puerperal infection (Sk. *Sutiká*) takes place. Four or six hours after labor, after the mother has been refreshed by a good sleep, the child may be put to the breast for a few minutes, and then for two or three days until the secretion of milk is established, at the interval of 4 hours after which it should be nursed every two hours from 6 A. M. to 10 P. M. The nipples should be gently cleansed after and before each nursing with Eau de Cologne. The breasts for a short time after labor afford a secretion of whitish or faint yellowish viscid fluid, resembling milk, but differs from it chemically in being richer in sugar, fat and salts. This is known as *colostrum*. It seems to have a laxative effect upon the infant and sweeps away the meconium from the bowels. The true milk secretion begins about the second or occasionally on the third day. The breasts which have already enlarged during pregnancy become still more tense and swell to such a degree that they are often very sensitive. If there is trouble in making the infant take the breast, there may be slight elevation of temperature. The suckling of the breast hastens the uterine involution by contractions. The puerperal woman for speedy involution requires absolute rest of body and mind, good nutrition and proper hygiene with aseptic treatment of the wounded parts. Liquids should be given for the first two or three days. Milk is the best food. But meat broths may be given. For thirst water or green cocoanut milk may be given. After third day a gradual return to the usual diet may be made. After the first week, extra nourishment, preferably in the shape of milk, between meals, should be allowed. The puerpera should have complete physical as well as mental rest. The lying-in-room should be bright, sunny and airy. Clothing and bed should be kept scrupulously clean with frequent changes of bedsheets and napkins. After she awakes infant may be put to the breast for a few minutes. For the first two or three days, the puerpera should be kept on her

back, with the head only a little raised on a small pillow. When nursing the infant she may assume the lateral position if this is found to be convenient, but all sudden changes of position, especially the sudden arising into a sitting or standing posture, for the first few days must be strenuously avoided. Neglect of such precaution has not been infrequently followed by fatal syncope. After the uterus has had time to contract firmly and the sinuses have been permanently closed, the danger becomes minimized. Therefore for greater safety, she should not be allowed to rise even to pass urine or to have movement from the bowels for which she should be induced to use bed-pan. Bowels may be moved third day, if there is no natural movement, by a simple emema of soap and water.

Birth Control Birth-pangs are unforgettable. Moreover births have to be spaced two to three years in order the children may be healthy, well-taken care of and to spare the vitality of the mother. Rapidly succeeding pregnancies sap her health and energy. Modern women want freedom to enjoy varied aspects of life. They do not want life experience to be limited from kitchen to pregnancy and parturition. Poor women have neither the health nor the resources to bring forth, feed and educate more than three or four children. Due to many social and economic factors a large number of girls are finding it hard to be suitably married. But some of them at least do not want to forego the knowledge of sexual experience. Many widows and divorced, once accustomed to orgasmic pleasures, find them too tempting to be given up. But they should have the moral courage to overcome social prejudices, knowing that more than voluptuous ecstasies one or two children make up the fullness and richness of a woman's life. Though in contracted pelvis, Cæsarean or extraperitoneal section may be quite safe and easy, yet in cardiac, diabetic and renal complaints pregnancy may prove dangerous to life. But sexual impulse is so powerful that health, comforts and future consequences are often forgotten in its intoxication. Birth control is therefore a social necessity, otherwise it has been leading to individual miseries, poverty, abortion, infanticide. It may be said that the poorest classes of people need this check of birth more than the rich and the middle-classes. And the poor would not have the intelligence and patience to exercise the prudential control of births. And if the intelligent classes persist in birth controls, they will be simply swarmed by the improvident thoughtless underworld. But it is not the quantity of births, but their quality of survivals that will count in the long run. It is better to have a few healthy well-fed intelligent children than a number of ill-fed miserably-clad sickly half idiots. It is better to have a few healthy children with fewer deaths than many sickly children with numerous deaths. From the age of 25 to the age of 40, 4 children are quite sufficient for a woman at the intervals of 5 years, and give her

of lives Syphilis by the induction of abortions and gonorrhoea by sterility check the natural increase. Massai youths of Africa are allowed free sexual intercourse with unmarried girls, but to keep down the numbers, pregnancy is punished, and to prevent conception coitus interruptus by man and uterine kneading by maiden are practised. Even the most primitive peoples practise birth controls. Their contraceptive methods may be crude, but they have empirical value. The Austrian woman, when she wants to prevent pregnancy, after intercourse, squats upright with the legs widely separated, and by a sinuous movement of the perineum and a simultaneous powerful bearing down pressure she expels the semen on the ground. Skilled Japanese midwives understand by means of pressure, rubbing and kneading through the abdominal walls (not by the vaginal route) how to induce antversion or retroversion of the uterus to such an extent as to prevent the occurrence of conception. It is said that the only inconvenient consequences of this procedure are trifling pains in the lumbo-sacral and inguinal regions, and some trouble in urinating during the first few days after the manipulations have been affected. Later when the girl wishes to be a mother, by a reversal of the manipulations the uterus is restored to its natural position. But in a woman who has once given birth to a child, the result of the manipulations is less to be depended upon than in the case of a nullipare. Women of the poorer classes in Italy sit upright in bed immediately after intercourse, and by coughing and in conjunction with pressure on the abdomen effect the expulsion of the semen. In France and Transylvania during intercourse the woman, just before the male ejaculation begins, presses forcibly with her finger on the base of the erect penis just in front of the prepuce. the urethra is occluded by this digital compression, the semen regurgitates into the bladder and is subsequently evacuated with the urine.

Prolonged lactation is used by women of many countries as a preventive of conception. Suckling of the nipples by the baby's lip causes contractions of the uterus, and if the contractions are strong enough they are likely to expel any fertilized ovum, if any has implanted there. But as a contraceptive measure it is quite unreliable.

Coitus interruptus as a contraceptive is widely prevalent among uncivilized and civilized peoples. It is mentioned in the Bible that Onan practised it (Gen 38 9-10). It consists of removal of the penis from the vagina before the emission of semen. To withdraw suddenly the penis from the surrounding gentle support and contact of vaginal epithelium when it is badly needed for its relaxation, and to deprive it of the vaginal soothing secretion gives shocks to the nervous system. Its cumulative effect may cause nervous weakness. If before orgasm penis is withdrawn which is usually the case, her pelvic organs remain congested.

and if it be continued long she may suffer from metritis. She is deprived of the stimulating effect of the absorption of semen through vaginal epithelium and uterine mucosa. It is known that before main ejaculation takes place, small preliminary exudations are common and in them spermatozoa are found. When the erection of penis has lasted for sometime beads of secretion contain Cowper's glandular and spermatozoal drops. Semen may be deposited in the vulva and pelvic region. From there in the next coitus they may be introduced into the vagina. So spermatozoa have plenty of chances to creep into the uterus and thence into the Fallopian tube for fertilizing the ovum. Though coitus interruptus is not very reliable as a preventive of conception, it is popular, for it costs nothing and requires no previous preparation. Many women, especially in China, remain passive holding back sexual excitement and orgasm, believing that such passivity prevents conception. Uterine cervical glands under sexual excitement supply a variable quantity of alkaline secretion which increases the motility of spermatozoa. During orgasm the cervix makes some gasps like the opening of the mouth of the carp, and during copulative movements glans penis may be interlocked with the cervical opening so semen may be aspirated directly into the uterus. So female orgasm facilitates conception, and frigid women are generally sterile. But not always. Spermatozoa can penetrate into the uterus afterward if the vaginal secretions are not very acid to kill them. Chinese women also sit upright after intercourse, cough and drink a glass of cold water. Intercourse during the intermenstrual *safe period* may be unproductive but it comprises only a few days, and in those the women feel the minimum of sexual urge. During the 1st war when the German soldiers were given home leave only for two days, conception in relation to menstruation has been studied. The studies show that from the first day of the period onwards the fertility curve rose to the highest point on the sixth day, remaining there the twelfth day, and gradually diminishing to the twenty-first days. This fertility curve corresponds with ovulation. Menstruation commences with the tension of the maturation of the ovum. In about 12 days the ripe ovum is set free by the bursting of the Graafian follicles, and it enters into the fimbriated extremity of the Fallopian tube, where spermatozoa can ascend from the uterus and live in health for three weeks. During menstruation the cervix opens as well as in orgasmic gasps. After the commencement of menstruation in about 12 days it enters into the Fallopian tube. If it be not fertilized there, it begins to decompose and within a few days enters into the uterus wherefrom it is flushed out with the menstrual flow. So the 1st week preceeding the menstruation may be comparatively safe, if sexual intercourse is not accompanied by orgasms.

Watery spermicidal chemical solutions are quite effective contraceptives if during sexual orgasmic movements semen has not been

directly aspirated into the uterus. But frequent douchings destroy the normal vaginal bacterial flora whose acid secretions does not allow the gonococcus to grow there. Douching also reduces the natural secretion and sensitiveness of the vagina, thereby diminishing the pleasurable sensations of the sexual congress. Plain luke warm water is sufficient to reduce the motility and viability of spermatozoa by diluting its living medium. Normal saline water is more effective. A tablespoonful of common kitchen salt dissolved in a quart of water makes a good douche. $\frac{3}{4}$ ounce of vinegar or citric acid to a quart of water makes an excellent spermicidal solution. A little fresh lemon juice, 1 per cent solution of lactic acid or a little acid whey may be added to water with economy, speed and advantage. One per cent alum will have the additional advantage of contracting the vaginal orifice which is lax and stretched after childbirth, thus making the coitus more pleasurable as if with a virgin. Permanganate of Potassium (1 : 3000) possesses in addition to contraceptive and contractive power bactericidal activity, it is therefore useful when there is any fear of venereal infection. Cold douching is not desirable as mucous congestion and catarrh may be provoked thereby.

Suppositories and Pessaries consist of cocoa-butter, gelatine, vaseline or oil in which is incorporated a certain amount of quinine or alum. One of these is introduced into the vagina and it melts by the body heat and spread over the vaginal interior to plasmolyze spermatozoa when they are discharged into the vagina. To women with a deficient secretion of Bartholin's glands the melting fat may act as a pleasant aromatic lubricant, but to one who has normal or excessive secretion, the melting fat robs the frictional pleasure of the sexual congress. Quinine is not only a plasmolyzer and spermicide, it is also a local irritant and a general tonic. Through local irritation it may cause undue sexual erethism and catarrh. Quinine is also absorbed through vaginal epithelium. In malarial localities it will have curative and prophylactic effect. But there may be sensitive persons who by its habitual use are likely to suffer from giddiness and buzzing sensation in the ear. Habitual use of alum may have the effect of hardening the vagina. Fat impedes the motility of spermatozoa. So any fatty substance such as vaseline or oil possesses contraceptive quality. Quinine pessaries may be easily and inexpensively made at home with the following ingredients: quinine bisulphate $\frac{1}{4}$ oz, borax $\frac{3}{4}$ oz, gum Arabic 1 oz, cocoabutter $\frac{1}{4}$ lb. Melt first the cocoa butter over a slow fire, and then add all other substances, stir and mix them with a wooden spoon. Then leave it to cool. When it is solidified, cut it into 40 equal pieces. There are some who object to the grease of cocoabutter. They can substitute it by gelatine and glycerine. This quinine cocoabutter tablet should be introduced into the vagina a few minutes before intercourse, and it will melt by the body heat.

bacillus of chancre Swab the same parts with 1/2,000 perchloride of mercury, paying particular attention to the mouth of the prepuce, corona and frenum, all of which are particularly apt to be abraded More or less concentrated alcohol may also serve for sterilizing virulent syphilitic virus Inject into the urethra of 2 p, c protargol or 10 p c argyrol to be retained for three minutes Inunction of the parts with 33 p c calomel ointment Wrap thus the penis in sterilized paper for three hours

Occlusive pessaries are of various types The *Dutch Mensinga Pessary* is a hemispherical cap with a spring rim It is introduced preferably so that the convex surface is toward the cervix and the concave surface towards the vaginal opening to close up the whole end of the vagina The ring rests anteriorly behind the pubic bone and posteriorly on the vagina high up Thus the whole end of the vagina is occluded and the semen is denied access to the cervix The spring and the vaginal muscles make fine adjustments during copulative movements Next day after copulation, it should be douched with soapy water or Listerine to destroy any spermatozoa, then remove it and wash it It may be inserted any time needed before intercourse It is pretty reliable It is popular in Holland But as it has to cover the whole end of the vagina in order to be effective, it stretches the vaginal walls to remain in position And it deprives the surrounding sensitive portion of the cervix of the contact if the penis and semen which is easily absorbed there *Cervical Occlusive* caps with or without attachment are available This is a small cap to fit over the cervical neck, so that the spermatozoa cannot swim into the uterus, and it also prevents the interlocking of the glans penis with cervical canal so that semen cannot be directly aspirated into the uterus Otherwise it leaves the greater part of the vaginal canal and its ends round the cervix in natural contact with the penis and semen It is an improvement over the bigger vaginal cap, if it can be well-fitted and kept in the position It has solid rubber or air rim Before insertion the rubber cap should be moistened with very soapy water so as to allow it slip easily It may be besmeared with quinine ointment or lactic jelly both inside and outside so that it may not be necessary to use a spermicide cocobutter quinine tablet, ointment or douch later In order to insert the cap properly the woman should be in a stooping position, sitting on her heels with her knees completely bent, and she should press the rim of the cap with her longest finger so that it is pushed into the opening and firmly pressed round the cervical protuberance when it has reached the end of the vaginal canal When the cap is once firmly adjusted, it would not be dislodged by copulatory movements and it may stay there a couple of days But it is desirable to feel with finger that it is in its place before every sexual union Before intercourse it is necessary to use spermicide soluble pessary so that when the cap is taken out no living spermatozoa

may remain in the vagina and penetrate into the uterus. In order to get out the cap, the longest finger should be pushed under its rim and jerk it off. The cap with ribbon or attachment may be pulled out easily. But pulling the cap by the attachment may draw down or suck the uterus. The cap should be sterilized, washed and dried until it is next wanted. Sometimes a sponge is attached to the rubber cap to contain spermicide, simple quinine powder, alum, vinegar or lemon juice so that it becomes a double security. But that makes the cap a little heavy. The vaginal secretions of some woman make the rubber decompose quickly. And this makes decortication and erosion of the cervix and vaginal ends. Greasy soluble pessaries are not liked by many refined sensitive women. The American women therefore prefer gold or platinum caps. Some German women use *Silver Cap* which fits on the cervix like a thumb on the finger. The correct size of each person can only be determined by medical measurement and it has to be removed at each menstrual period. Though it is a safe contraceptive it does not permit the escape of cervical and uterine secretions either during sexual excitement and orgasm or at any other period. This is likely to cause uterine troubles.

Intra-uterine springs and studs are made in various shapes of gold, silver, platinum, bone, ivory, glass, plastics. The stud button remains in the vagina outside the cervix while the hollow stem occupies the canal of the cervix and the uterine cavity. It is claimed that the stud prevents the entry of the spermatozoa or other matter from the vagina, but being hollow it can be kept during the menstrual period and permits the escape of the menstrual flow. If spermatozoa find entrance and fertilize the ovum in the Fallopian tube, the fertilized ovum cannot grow in the uterine cavity due to the obstruction of the base or the hollow stem. It was first introduced to facilitate impregnation in cases of stenosis of the cervix. And thus when the cervical canal was enlarged, it was taken out so that spermatozoa may easily swim into the uterus. The intrauterine stud is kept for a year or so. Then it has to be removed by an expert hand without which it cannot also be introduced, to clear it of any accretion or deposition that has accumulated round it. Though pregnancy is impossible with its obstruction, it causes inflammatory discharges, endocervicitis. Not only spermatozoa, but also venereal and pathological germs can enter into it through the cervical opening that is kept open by the stem.

There is no safe and harmless contraceptive. To defeat the designs of nature with immunity is a hard task. Reproduction is a biotic urge, so it is imperious. But spacing births has become necessity, so that better and healthier children are born. That is only possible if they are born at the interval of 4 or 5 years. But reproductive organization is on grander scale. Woman's body should not be used simply as a

reproductive machine. Though children immeasurably enrich woman's life and fill it with spiritual joy and ecstasy, but that is not the all of her life. She must have good health, enlightened mind, pleasures and refinements of life, so that she enjoys not only her own life, radiates joy with her divine womanhood and motherhood, but motherhood should be of a quality that would add glory to her and enrich humanity. Motherhood would no doubt enlarge her ego. Her selfishness would be spiritualized into altruistic tendency. But she must be physically and mentally fit before she should be a mother. She should be able to feed, clothe and educate them properly. Without these preparations if she brings a brood of children without any forethought, she commits a sin against herself, her children and society. Consequently birth-control methods need to be improved for the betterment of the human race. It will be with the improvement of scientific technique. It is the crying need of modern woman. And the call will not go unheeded.

XII—SENESCENCE

"Fair, fat and forty" is the common proverb. Nature like a good engineer fills up all the defects of form and shape with a soft cushion of fat. The face becomes roundish. There is a ruddy glow in the face due to higher blood pressure. The eyes give a contented look. There are fat deposits in the abdomen and in the breasts. The fat deposits are due to hypofunctioning of the thyroids, interstitial cells and ovaries which are high oviducis, burning up fat. Due to hypofunctioning of the thyroids, the heart loses its lustre, becomes coarse and thin, there is constipation. However constipation is alternated by diarrhoea. The accumulation of the faecal masses stimulates the intestinal mucous membrane and gives rise to profuse aqueo-mucous secretion. The firm faecal masses are then liquified. The intestinal wall is lubricated, and the constipation gives place to diarrhoea lasting for a couple of days. Due to hypofunctioning of the pituitary glands, there is less metabolism of calcium, and calcium is deposited in the intima of the arteries which consequently becomes narrowed, and consequently there is a tendency to arteriosclerosis. Sexual desire is increased, but potency is reduced.

There is fatty degeneration, fibrous transformation and retrogression of the follicle. In the later stage of degeneration it appears as a vesicular body with a relaxed wall, thrown into numerous folds, this folded wall being formed by the folliculi. The cavity of the follicle is reduced to a mere cleft. In the last stage of regressive metamorphosis, the follicle is completely transformed to a fibrous mass. The ovaries show atrophy and gradually shrink to the form of small fibrous cords.

attended by diminution in the functional activity which corresponds with the characteristic changes of atrophy and involution in the structure of endocrine glands, organs and of the diminished area of the capillary blood vessels. The old are not so tall as in the prime of life. The vertebral column is never straight. But in old age it becomes more curved, thus resulting in the diminution of the stature. But this is not the main cause. The softer cartilages and elements of the spinal column become harder, change into bone as that change occurs, they acquire a less extent and become smaller, and the result is that the vertebrate column is reduced somewhat. And thus the old man is shorter than when he was younger. The cheeks of the old are sunken. The eyes have fallen far back. The lips are drawn in. These indicate that there has been the atrophy of the internal organs that keep up the muscular and vascular tone. The gait becomes shuffling. The foot is no longer lifted free from the ground as the old man walks along. He does not rise upon his toes, but the sole of the foot is kept nearly flat as he drags it. This indicates a lessened power of the muscles, a lessened control over the action of the muscles. In the old there is some loss of memory, greater difficulty in grasping new ideas. It is known that the weight of the brain is relatively much reduced. There is a greater liability of the bones in the old person to break. It is well-known that a column of metal if hollow, is stronger than the same amount of metal in the form of rod. So with the bones. If they have the spongy structure, if their interiors are full of little cavities with intervening spicules acting as brices in every direction then they acquire great strength with little material as in children. But in the old much of the internal spongy structure is dissolved away and there is left barely more than an external shell. But the old possess great latent regenerative force in their skin and they recover from wounds very quickly. The old person needs little warmth and his body produces less, as the child needs more warmth and his body produces more. Old man like a ripe fruit may fall down without any regret or remorse if he has lived an active useful life. In Greece no one could be magistrate if he was not in sixth decade. In China old men are respected and are allowed to keep beards as a badge of honour. With the rich experience of full and active life, the old man is the natural instructor of the youth. With the stormy passionate life behind him, he can be serene and can have detached and dispassionate outlook of life. With their varied experience old men are real assets of a country. Personality is an expression of endocrine glandular functioning and nutrition. Time will come not in distant future when man will be as much ashamed, as of a heinous crime to be ill, to have sickly and stupid children.

XIV—DEATH

Death is due lack of co ordination of specialized differentiated vital organs. All the organs do not show defunction at the same time. Potentially all the multicellular organisms like reproductive cells are immortal. Carrel by transferring the culture at frequent intervals into fresh nutrient medium was able to keep alive in perfectly normal healthy condition a culture of tissue from the heart of a chick embryo for more than 15 years, that is much longer than life span of the fowl. Various tissue cells have all been successfully cultivated in vitro. Natural death is biologically a relatively new thing which made its appearance after living organisms advanced a good deal in their evolution to the metazoan type. It is the differentiation and specialization function of the mutually dependent aggregate of cells and tissues which constitute the metazoan body that brings about death, and not any inherent or inevitable mortal process in the individual cells themselves. Human life depends upon the proper performance of the function of circulation and respiration. So death, whether the result of disease, of violence or of senile decay, is due ultimately to the cessation of these functions. The cessation of circulation may be sudden or gradual. The former is witnessed in deaths from syncope and shock, the latter in those from asthenia. The chief force in the maintenance of the circulation is the propelling of the heart. When from the occurrence of any organic or structural lesion, the heart is no longer capable of propelling its contents into the arteries, circulation is stopped, and death ensues. The action of the heart may be made inoperative by violent nerve impulses as fright or grief, by such direct or reflex impressions as those resulting from a blow upon the lower chest or epigastrium or from rupture of abscesses of the gravel urn. Syncope may be transient, however, as in fainting. There is then a momentary cessation of the heart's action, producing in many of the cerebral centres, resulting in a brief period of unconsciousness. In a fatal syncope the individual suddenly turns pale, a cold sweat mingles itself, he becomes dizzy, the pupils dilate, vision becomes dim, pulse slow, irregular and flickering, and in an instant life is gone.

Death from cessation of respiration is known as asphyxia, and may be sudden or gradual. Sudden failure of the respiration is due to a number of causes, operating within without the respiratory organs. The former class includes all obstructions and occlusions of these organs and all paralyses of their muscles as a result of injury or disease, local or central in character. Causes external to the respiratory organs include all obstructions by foreign bodies or by pressure upon any part of the respiratory passage as in suffocation, strangulation by hanging or drowning and

the action of toxic gases There are violent efforts at respiration The expiratory efforts become violent, unconsciousness and convulsion or a few irregular twitchings of the muscles supervene, the face becomes swollen and cyanotic, the eyeballs protrude, then follows a period of relaxation, interrupted by occasional deep inspirations which become finally spasmodic gasps, and last of all the heart stops A gradually fatal asphyxia is a common result of disease It is produced by any morbid process which gradually obliterates the lumen of the respiratory passages, neoplasms of the larynx, oedema of its mucous membrane, false membrane of the trachea and bronchi, oedema of the lungs and pneumonic exudation Failure of the respiration is occasionally the prominent symptom in death from phthisis Death from paralysis of central nervous system, causing the failure of the circulation or respiration, is due to electric shock and lightning stroke

Comparative Adolescence and Longevity

<i>Animal</i>	<i>Adolescence</i>	<i>Life</i>	<i>Animal</i>	<i>Adolescence</i>	<i>Life</i>
Dormouse	3 months	4-5 years	Hog	5 years	30 years
Guinea Pigs	7 "	6-7 years	Hippopotamus	5 years	30 years
Cat	1 year	12 years	Lion	6 years	30-40 years
Goat	1 1/2 m	12 years	Horse	6 1/2 years	35 years
Fox	1 1/2 m	14 years	Camel	8 years	40 years
Cattle	2 years	18 years	Man	25 years	75-100 years
Dog	2 years	15-20 years	Elephant	30 years	100-120 years

XV—RELIGION

The last gasping breath of the dying man is his soul that departs from the dead body to take a new abode That has given the separate existence of the *soul*—the double of the body During dreams the soul of a sleeping man wanders far and wide That explains easily to the primitive mind the phenomena of dream and death Man clings to life tenaciously He hates to be separated from his beloved ones The possible re-union of the beloved ones on the soul-plane comes to him as a great relief and consolation Gradually from this have evolved the conception of the *immortality of soul*, and *heaven* as the abode of the immortals Every action must have its causative agent There are births, sickness and death There are smiling sunshine, darkening clouds and howling tempests There are brilliant sun, silvery moon and they are swallowed (eclipsed) by monsters The bountiful fruitful tree is uprooted by hissing storm The generous milch cow is killed by pestilential pox The good and beneficent deeds of nature are performed

like violent earthquakes and reduce the noble achievements of modern civilization into dust heaps. It may be wars are being fought for political and economic advantages. One generation makes an organized bid for supremacy, and in its attempt to achieve their aims make the sacrifices so that their descendants get the benefit out of it. It is the biologic urge of expansion. War is a pretty good test of the organized co-ordinated efficiency of the people. War eliminates the weak and the inefficient, and make the strong, able and adventurous people to expand. This is the nature's cruel way of progress. But is this the only way? Co-operation is a better way than rivalry, hatred and competition. Hatred embitters our feeling and poisons the source of humanity. Like war it brutalizes man. And co-operation will benefit all alike. The world is vast and wide enough to accomodate all people that are not only living, but will be added in next hundreds of years. Instead of mutual slaughter of peoples for problematical imperial benefits, if there is a united effort to develop the Amazon and Paraguay basins, the wastes of Siberia, Australia, Rajputana by drainage and irrigation, food resources of the world may be increased enormously. The Marquis wheat, the earliest *ripenner*, so far established, needs a hundred days in which to mature. If that figure could be reduced by a mere six days, by the artificial selection of earlier ripening grain, a strip of some 50 million acres would be added to the known West Canadian wheat belt. In Australia, Algeria, Sind and Rajputana, the growers have to evolve wheats that are capable of thriving with a minimum amount of rain. Moreover proteins will be synthetically manufactured from nitrogen, and carbohydrates from wood fibres. Coal and fuel oil would be exhausted in a hundred years. Power would have to be generated from water falls, solar radiation and wind mills. That means that big industrial plants will possibly have to be shifted to the tropics. That needs world-wide co-operation and good will. That will bring health, better living and intellectual and moral advancement for all.

World Federation is not an absurdity. It is not beyond the practical range of politics. The League of Nations was an attempt to bring the world together under the domination of its senior partners who wanted to retain in perpetuity all the spoils of victory. That was not the right approach. Without equality there can be no freedom. Without freedom there can be no spontaneous mutual co-operation. And without voluntary co-operation no organization can last for long.

Races have been inextricably mixed everywhere, particularly in Europe and white America. Racial basis of the state is no more possible anywhere. Theocracy is only possible in the minds of a few mischievous schemers or religious paranoiac's wanton imaginings. An ethnic group of a common language and culture forms an ideal modern state. The

federation of such states is desirable, and if Big Powers heartily join if for human progress in no time it can be easily enforced

The Federal Council, composed of the members of the component states, will frame the constitution, issue universal currency, postal stamps, see that standardized weight and measure based on metric system are everywhere used. Only the federal government will have at its disposal army, navy and aircrafts to enforce its will, and bring under submission any recalcitrant state. It will require but a minimum of military organization, when all the states are disarmed and allowed only to keep a police for preserving internal order and security. The calendar may be changed into 13 months of 28 days each, keeping in correspondence with the lunar phase if necessary, making the extra day as the New Year's Holiday, or equinoctial and solstitial months may be 31 days, and the rest of eight months of 30 days, thus making it correspond to movement of the earth round the sun. The Federal Government may secure its financial requirements by levying a small import and export tax on the imports and exports of every state, either of raw materials or of manufactured goods, inter-state postal dues, inter-oceanic canal dues, the issue of currency. Each state will enjoy local self-government but in accordance to Federal Constitution. All appointments must be regulated by strict competitive examination. A group of population of 50 millions in each state will send 5 members to the Federal Council. Each one of them either representing Finance, Industry, Commerce, Agriculture or Labor. Thus all interests will be equally represented. And numerical majority will not be in a position to impose their arbitrary will on the minorities.

Though the world federation is desirable, ideal, contributory to human progress and advancement, it is not to be, for its foundation is to be laid on the sacrifice of the vested political, military and economic interests of the imperial powers. Already such kinds of alignments exist, but tottering within the orbits of the imperial and economic combines of Great Britain, France, Germany, Russia, Italy, America and Japan. Why should the weak and the inefficient who by their disorganization have lost their footing in the world economics and politics be given an equal status with those who by their victory have dislodged them and occupied their place? But the sick, invalids, epileptics are not killed outright, but fed, nursed, medicated so that they can become useful members of the society. But power of possession is intoxicating. As the victorious clans have been molded into tribes, and tribes into nations, and nations into states, states into empires, so empires will be fashioned into Brotherhood of Peoples. It may take a few hundred years, even a millennium, but it is sure to come. That is the biologic way of creating a superman type.

INDEX

Subject	Page	Subject
Adolescence	20-22	Marriage
Alcohol	33	Marriage Disharmonies
A Feast of Love	64-74	Masturbation
Amino Acids	23	Menstruation
Animal Rut	14	Middle Aged Woman
Acquired Characters	79	Menstrual Precox
Birth Control	92, 99	Milk
Body Machine	22	Nutrition
Carbohydrates	26	Nocturnal Pollution
Care of the Baby	89	Old Age
Childhood	6-10	Pains of Love
Childhood Nutrition	7	Pituitary Gland
Chromaffin System	17	Pregnancy Discomfort
Circumcision	59	Pregnancy Signs
Contraceptives	94-99	Pregnancy Diet
Death	104-105	Proteins
Education	33-38	Puerperal Period
Eggs	30	Puerperal Infection
Embryology	75	Puberty
Epiphyseal Closures	20	Pubertis Precox
Eunuchoid Hypogonadism	16	Puberty & Longevity
Fats	27	Pubescent Hygiene
Federation of Peoples	107-109	Religion
Fruits	28	Secondary School
Fish Diet	24	Semen
Gonads	24	Senescence
Gonorrhea	56	Semity
Habit Formation	1	Sex Characters
Head Form	21	Sexual Impulse
Hermaphroditismus	18	Sexual Intercourse
Infancy	1-6	Sexual Potency
Infant Feeding	3	Syphilis
Infant Schools	9-34	Thyroids
Labour Pains	87	Hymens
Library	37	Tobacco
Legumes	8, 27	Univerity
Leucorrhoea	41, 47	Vegetables
Love	65	Virgin Woman
Malformation	56	Vitamins

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